SYSTEMS TYPEWRITERS (Console, Inquiry Unit, etc.)

1033, 2740, 2741

Printing elements for these machines are available in various character arrangements of Data 1 or Data 2 Font ... see illustrations and "Table of Printing Elements" below. Characters illustrated correspond to the IBM Standard Paper Tape and Transmission Code (PTTC). Data 1 Font is 10 pitch (10 characters/inch) ... Data 2 Font is 12 pitch (12 characters/inch). Note: Character spacing changes cannot be made in the field.

One printing element is furnished at no charge on initial machine order. Additional elements may be purchased.

Note: The keyboard furnished on an initial machine order will have keytops to match the characters of the printing element specified.

1033: Only mono case elements are available.

2740/2741: Any one of the elements listed under "Table of Printing Elements" may be specified on an initial machine order. Notes: (1) If an element other than Data 1 or Data 2 Font is specified, the keyboard interposer arrangement provided differs from that furnished when a PTTC/BCD or PTTC/EBCD element is specified. The line code of a graphic may thus differ between the two types of keyboards, making the standard OPD Selectric element incompatible and not interchangeable with a PTTC/BCD or PTTC/EBCD element. The line code assignments of the Selectric element are shown in the 2740 SRL Manual (GA24-3403) and the 2741 SRL Manual (GA24-3415) ... (2) The 2741 when attached to a 3790 system supports feature #9812 - Print Element P/N 1167043 only.

PTTC/BCD Code for Use with Other Than System/360

Dual Case Printing Element (#9567 - Std. Arr.) - Used for both home loop (off-line) data preparation and point-to-point data communications where both upshift and downshift codes and corresponding graphics are required. All 88 printable characters are illustrated below.

=	;	%	"	★	)	⌑	:	'	(	±	1	3	5	7	8	0	2	4	6	9	#
?	T	V	X	Y	¢	S	U	W	Z	,	/	t	v	x	y	@	s	u	w	z	,
J	L	N	P	Q	—	K	M	O	R	!	j	l	n	p	q	-	k	m	o	r	$
A	C	E	G	H	+	B	D	F	I	.	a	c	e	g	h	&	b	d	f	i	.

UPSHIFT DOWNSHIFT

Mono Case Printing Element (#9575 - Std. Arr.) - Used in terminals connected to Data Processing Systems where one shift is normally required. Has capital letters on both upshift and downshift modes... otherwise, characters are identical to those of the Dual Case Printing Element illustrated above.

=	;	%	"	★	)	⌑	:	'	(	±	1	3	5	7	8	0	2	4	6	9	#
?	T	V	X	Y	¢	S	U	W	Z	,	/	T	V	X	Y	@	S	U	W	Z	,
J	L	N	P	Q	—	K	M	O	R	!	J	L	N	P	Q	-	K	M	O	R	$
A	C	E	G	H	+	B	D	F	I	.	A	C	E	G	H	&	B	D	F	I	.

UPSHIFT DOWNSHIFT

Other Printing Arrangements - In the following illustrations, only the characters which differ from those of the "Standard Arrangement" are shown.

Arrangement A: Dual Case (#9568), Mono Case (#9578)

>					]		ƀ	:	[	⧻											
					△																
					\																
					<																

Arrangement E: Mono Case (#9573)

						<															
											&					>					
																/					°
																—					

Arrangement H: Dual Case (#9569), Mono Case (#9579)

>		(			]	)	ƀ	:	[	⧻											=
					△											'					
					\																
					<											+					

Typewriter Option: Dual Case (#9566), Mono Case (#9574)

±	#		&			@	$	¢		"											'
					¼											½					
										:											;

Slashed Zero: Dual Case (#9570), Mono Case (#9576)

																Ø					

Systems Typewriters (cont'd)

PTTC/EBCD Code for Use with S/360 or S/370

For 2740/2741:
Dual Case (#9571), Mono Case (#9592)
Dual Case (#9591)

The basic PTTC/BCD codes illustrated above are compatible with the basic PTTC/EBCD code with respect to BCD transmission bit values. Graphics of #9571 and #9592 are the same as those of #9567 and #9575 respectively, except for the following substitutions in five special character positions. Graphics of #9591 are the same as #9571 except printing is at 12 characters/inch.

			>		<			"										
								¦										
								¬										

PTTC/EBCD Code for Use with S/370 mdl 135, 145, 155

For 3210 mdl 1 and 2: A Dual Case, 10-pitch, Data 1 Font element is supplied and need not be specified. The graphics are as shown below.

1	3	5	7	9	0	2	4	6	8	=	‹	¢	;	!	+	%	&	¬	:	›	"
J	L	N	P	R	*	K	M	O	Q	$	j	l	n	p	r	@	k	m	o	q	#
/	T	V	X	Z	-	S	U	W	Y	,	)	t	v	x	z	_	s	u	w	y	?
A	C	E	G	I	'	B	D	F	H	.	a	c	e	g	i	(	b	d	f	h	¦

Systems Typewriters (cont'd)

Specify: For Plant Installation --

[1] One Feature # at no charge from the following table, based on machine model and system involved. For 2740/2741, see "Machines" pages and "Note" in text on preceding page before specifying an element other than Data 1 or Data 2 Font.

[2] #9104 if element selected has 10 character/inch spacing ... #9105 if it has 12 character/inch spacing. [Note: 10 character/inch spacing cannot be changed to 12 character/inch, or vice versa, in the field.

For Field Installation --

2740/2741 keytop changes for installed machines, necessitated by other than System/360 compatibility may be made on a Time and Material basis.

Additional Printing Elements

Specify Part No.

TABLE OF PRINTING ELEMENTS

	Char/Inch Printing	Type Font	Printing Arrangement	Dual or Mono Case Element D=Dual, M=Mono	Feature # for Plant Installation Only	Part No. for Additional Element	1033	2740 mdl 1/2741	2740 mdl 2
PTTC/BCD - Other Than System/360	10	Data 1	Standard	D	9567	1167938		X	
				M	9575	1167939	X	X	X
	12	Data 2	Standard	D	9597	1167997		X	
	10	Data 1	A	D	9568	1167940		X	X
				M	9578	1167941		X	X
			E	M	9573	1167970		X	X
			H	D	9569	1167942		X	X
				M	9579	1167943	X	X	X
			Typewriter Option	D	9566	1167948		X	X
				M	9574	1167947		X	X
			Slashed Zero	D	9570	1167961		X	X
				M	9576	1167962		X	X
PTTC/EBCD S/360, S/370	10	Data 1		D	9571	1167963		X	X
				M	9592	1167998		X	X
	12	Data 2		D	9591	1167996		X	X
Standard OPD Selectric Elements (See TC 24 for print samples)	10	Manifold 72	Standard OPD Arrangement	M	9806	1167010		X	
			Slashed Zero	M	9810	1167019		X	
	10	Courier 72	Pos. 0 has] over [Pos. 41 has ° over !	D	9808	1167015		X	
			Pos. 0 has ± over 1 Pos. 41 has ¼ over ½	D	9811	1167029		X	
			Pos. 0 has ± over 1 Pos. 19 has [over 6 Pos. 41 has] over !	D	9812	1167043		X	
	12	Scribe	Standard OPD Arrangement	D	9820	1167001		X	
		Elite 72		D	9821	1167007		X	
		Prestige Elite 72		D	9822	1167012		X	

Note: Print elements contain only the last 3 digits of the assigned 7-digit part number. When additional or replacement elements are desired, the 3 digits indicated on the element are to be used as a guide in determining the part number to be specified from the above list.

Type samples of the above Standard OPD Selectric Printing Elements are shown on the next page.

2740 -- see "Specify" under 2740 in "Machines" for explanation.

Systems Typewriters (cont'd)

Standard OPD Selectric Printing Elements

The following samples of OPD Selectric Type Styles are reproduced as near to actual size as high speed reproduction methods will permit. Because of inherent differences between printed and typewritten impressions, these type styles are not representative of typewritten material and should be used as a guide to type design only.

12 pitch
Part No. 1167001

IBM SCRIBE Type is a modern square-serif, design in the Elite family of type styles. It is ideally suited for the preparation of routine correspondence and reports.

ABCDEFGHIJKLMNOPQRSTUVWXYZ []@#$%¢&*()
abcdefghijklmnopqrstuvwxyz -_=+!°"'/?:;,.
1234567890

12 pitch
Part No. 1167007

IBM ELITE 72 Type is similar to the Elite type styles offered with the IBM Model C Typewriter. It is well suited for a wide range of typing applications.

ABCDEFGHIJKLMNOPQRSTUVWXYZ []@#$%¢&*()
abcdefghijklmnopqrstuvwxyz -_=+!°"'/?:;,.
1234567890

10 pitch
Part No. 1167010

IBM MANIFOLD 72 TYPE IS A SANS-SERIF TYPE STYLE DESIGNED FOR BILLING AND FORMS PREPARATION. IT PROVIDES A MAXIMUM NUMBER OF CLEAR CARBON COPIES.

ABCDEFGHIJKLMNOPQRSTUVWXYZ ±@#$%¢&*()
1234567890 -_=+!°"'/?:;,.

12 pitch
Part No. 1167012

IBM PRESTIGE ELITE 72 Type is a weighted type similar to the Prestige Elite styles offered with the IBM Model C Typewriter. It meets a range of typing applications.

ABCDEFGHIJKLMNOPQRSTUVWXYZ []@#$%¢&*()
abcdefghijklmnopqrstuvwxyz -_=+!°"'/?:;,.
1234567890

10 pitch
Part No. 1167015

IBM COURIER 72 Type is a square-serif design in the Pica family of type styles. The open spaced characters make it highly legible.

ABCDEFGHIJKLMNOPQRSTUVWXYZ []@#$%¢&*()
abcdefghijklmnopqrstuvwxyz -_=+!°"'/?:;,.
1234567890

10 pitch
Part No. 1167019

SIMILAR TO IBM MANIFOLD 72 (CODE 10), THIS TYPE STYLE HAS A LINE THROUGH ZERO (Ø) ELIMINATING CONFUSION BETWEEN LETTER AND NUMBER GROUPINGS.

ABCDEFGHIJKLMNOPQRSTUVWXYZ ±@#$%¢&*()
1234567890Ø -_=+!°"'/?:;,.

OTHER THAN SYSTEM/360 -- 1403 AND 1404 PRINTERS

Alphameric Chain (1403 models 1, 2, 4, 5 and 6, and 1404 model 2): A standard alphameric chain consists of five identical arrays of 24 type slugs (2 characters each) as illustrated below for Print Arrangement A. Only the first array is shown and indicates the 48 graphics included in the arrangement. Where a particular slug has characters other than those of Arrangement A, the differences are shown and identified as another Arrangement (B, C, etc.). For card and BCD bit codes associated with the special characters, see the chart to the right.

Standard BCD Interchange Code		Print Arrangement									
Card	Bit	A	B	C	D	E	F	G	H	J	K
8-3	8 2 1	#					=	+	=		=
8-4	8 4	@				>	-	-	'		
0-1	A 1	/	&	0		&					
0-8-2	A 8 2	‡									
0-8-3	A 8 2 1	,									
0-8-4	A 8 4	%					(		(		(
11	B	-				/					
11-8-3	B 8 2 1	$				°					
11-8-4	B 8 4	*									
12	B A	&	/		-	-	+	+	+	+	+
12-8-3	B A 8 2 1	.									
12-8-4	B A 8 4	¤				<	)		)		)

Character Position Numbers are assigned as follows for the five arrays in Arrangements A thru K:

1st array: 1-48 4th array: 145-192
2nd array: 49-96 5th array: 193-240
3rd array: 97-144

Numeric Chain (1403 models 1 and 2 only): A standard numeric chain consists of 15 identical arrays of 8 type slugs (2 characters each) as illustrated below. Only the first array is shown and indicates the 16 graphics included. Card and BCD bit codes associated with the special characters are the same as those shown for Arrangement A in the chart to the right.

Character Position Numbers are assigned as follows for the 15 arrays of the numeric chain:

1st array: 1-16 4th array: 49-64 7th array: 97-112 10th array: 145-160 13th array: 193-208
2nd array: 17-32 5th array: 65-80 8th array: 113-128 11th array: 161-176 14th array: 209-224
3rd array: 33-48 6th array: 81-96 9th array: 129-144 12th array: 177-192 15th array: 225-240

Alphameric Train (1416 used on 1403 model 3): A standard alphameric train consists of five identical arrays of 16 type slugs (3 characters each) as illustrated below for Print Arrangement A. Only the first array is shown and indicates the 48 graphics included in the arrangement. Where Arrangement H differs from A, the substituted characters are shown. Card and BCD bit codes for special characters are shown in the chart above.

Character Position Numbers assigned are the same as those listed above for the Alphameric Chain, 1-48, 49-96, etc.

Preferred Character Set -- 1420/1440/1460 Systems: For 1416 used on 1403 model 3 equipped with Preferred Character Set Feature (#5523). Card and BCD bit codes for special characters are the same as shown in the above chart for Arrangements A and H. The train consists of the following:

48 graphics -- 3-level preferred set

	PCS-A	PCS-H
Characters of primary preference appearing 8 times	0-9 . , - *	0-9 . , - *
Characters of secondary preference appearing 4 times	A-Z ¤ $ / &	A-Z) $ / +
Characters of least preference appearing twice	% # @ ‡	(= ' ‡

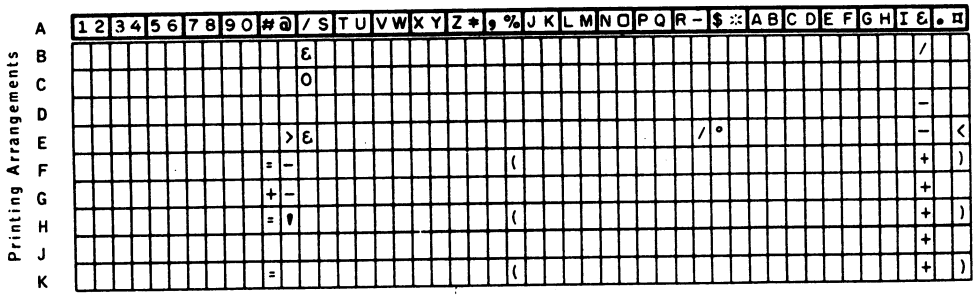
The 48 different graphics (combinations of 3 per slug) are arranged in 4 arrays of 20 slugs each, as illustrated below. Graphics are shown in the 2nd, 3rd and 4th arrays only where the slugs differ from those of the preceding array. The 1st and 3rd arrays are identical, as are the 2nd and 4th, as illustrated.

Character Position Numbers are assigned as follows for the 4 arrays:

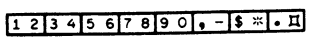
1st array: 1-60 2nd array: 61-120 3rd array: 121-180 4th array: 181-240

Chain/Train Layouts: In all of the following illustrations, the characters (graphics) are depicted as printed out.

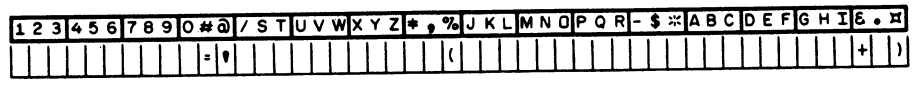
Alphameric Chain Layouts: For 1403 models 1, 2, 4, 5 and 6, and 1404 model 2



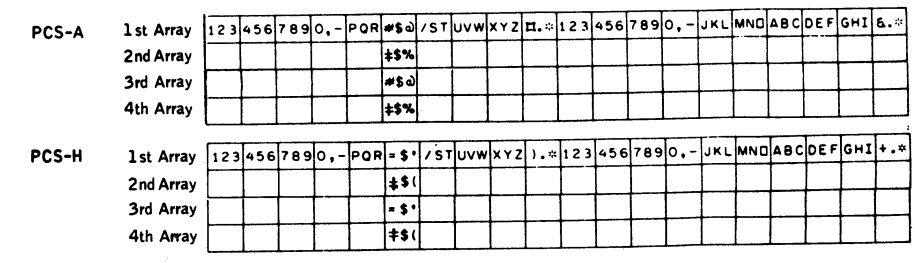
Numeric Chain Layout: For 1403 models 1 and 2 only



Alphameric Train Layouts: For 1416 (1403 model 3 only)



Preferred Character Set Train Layouts: For 1416 (1403 model 3 only)



OTHER THAN SYSTEM/360 -- 1403 AND 1404 PRINTERS

Print Chain/Train Arrangements: Print arrangements are assigned an alphabetic designation (A, B, C, etc.). The type size (or style) is denoted by a numeric suffix (A2, B3, J4, etc.) with 2 = .095" type size; 3 = .079" type size; and 4 = 1428 Type Style. Based on this coding, print chains/trains are assigned Feature #s as indicated below for each arrangement.

	System	Printer	Standard Type Style .095"	Standard Type Style Feature #	Alternate Type Style .079"	Alternate Type Style Feature #	1428 Type Style OCR	1428 Type Style Feature #	Reference
CHAIN PRINTERS	1401	1403 models 1, 2, 4 5 and 6, and 1404 model 2	A2 B2 C2	9601 9602 9603	A3 B3 C3	9581 9582 9583	A4	9591	Notes 1,2,3,4
	1440	1403 models 2, 5 and 6	D2	9604	D3	9584			
	1460	1403 model 2	E2	9605	E3	9585			
	1410 1420 7010 7040 7044	1403 models 1 and 2	F2 G2 H2 J2 K2	9606 9607 9608 9609 9610	F3 G3 H3 J3 K3	9586 9587 9588 9589 9590	J4	9599	
TRAIN PRINTERS	1410 1420 1440 1460 7010 7040 7044	1416 (1403 mdl 3)	A2 H2	9611 9618	A3 H3	9616 9617	A4 J4	9591 9599	Notes 1,2,6,8
	1420 1440 1460	1416 (1403 mdl 3)	PCS-A2 PCS-H2	9561 9563	PCS-A3 PCS-H3	9623 9625			Notes 1,2,5,7,8

Chain and Train Printers: Notes:

1) Any H arrangement listed has FORTRAN and COBOL capabilities.

2) Alternate Type Style (.079" high) arrangements A3 thru K3 can be used to print between punched holes on a card document and at a vertical spacing of 8 lines per inch rather than the conventional 6 lines per inch with .095" type. This permits 25 lines of printing on a standard punched card as opposed to 19 lines at 6 lines per inch. (Note: On train printer, only arrangements A3 and H3 are available.)

   Because of the greater type face density of the .079" type, ribbon life will be reduced when printing on continuous paper forms. This reduction will vary depending upon weight of paper, number of carbon copies, etc. There is little difference in ribbon life when printing on card documents.

Chain Printers:

3) Any arrangement can be ordered for either a fixed cartridge or interchangeable cartridge. See Interchangeable Chain Cartridge Adapter (#4740) in 1403 "Machines."

   On 1403s, any arrangement (A2-K2, A3-K3) can be equipped with an enlarged dash (in lieu of the standard dash) to print on continuous forms which will subsequently be separated into individual sheets for optical reading by a 1230 Optical Mark Scoring Reader (test answer sheets), 1231/1232 Optical Mark Page Reader (data sheets), or 3881 Optical Mark Reader.

   1282 Optical Reader Card Punch: Arrangement J4 (#9599) can be used on all models of the 1403, or a 1404, to prepare documents for 1282 optical reading. Only numeric characters 0-9 and special characters - and + can be optically recognized by the 1282...remaining special characters cannot.

   1287 Optical Reader: Arrangements A4 (#9591) and J4 (#9599) can be used on all models of the 1403 to prepare documents for 1287 reading. Only numeric characters 0-9 and alphabetic characters Q, N, S, T, X, and Z can be recognized by the 1287... other alphabetic or special characters in these arrangements cannot.

   1418 Optical Character Reader: The following arrangements can be used on all models of the 1403 to prepare documents for 1418 optical character reading: A2 (#9601), B2 (#9602), C2 (#9603), D2 (#9604), G2 (#9607), and J2 (#9609). Only numeric characters 0-9 and special characters - and ¤ can be optically recognized by the 1418... remaining special characters cannot.

   1428 Alphameric Optical Reader: Arrangement A4 (#9591) can be used on all models of the 1403 to prepare documents for 1428 reading. In addition to the alphabetic and numeric characters (A-Z and 0-9), special characters $. - , * / can be optically recognized... remaining special characters cannot.

4) A Numerical Chain (#9484 for .079" type size; #9485 for .095") is available for 1403 models 1 and 2 only. In addition to numeric characters (0-9), it contains ¤ - . , * and $ as special characters.

   Prerequisites: Interchangeable Chain Cartridge Adapter (#4740) and Numerical Print Feature (#5381) on the 1403, plus Numerical Print Control (#5380) on the 1401 Processing Unit, 1414 I/O Synchronizer (model 3, 4 or 8), 1446 Printer Control, 1461 I/O Control or 1462 Printer Control. See 1403 in "Machines."

Train Printers:

5) Alternate Type Style (.079" high) arrangements PCS-A3 and PCS-H3 can be used to print between punched holes on a card document. See Note (2), above, for additional information and limitations.

6) The following arrangements can be used to prepare documents for optical reading: A2 (#9611) for 1418 Optical Character Reader, A4 (#9591) for 1428 Alphameric Optical Reader and 1287 Optical Reader, and J4 (#9599) for 1282 Optical Reader Card Punch and 1287 Optical Reader.

   Arrangement A2, H2, A3 or H3 can be equipped with an enlarged dash (in lieu of the standard dash) to print on continuous forms which will subsequently be separated into individual sheets for optical reading by a 1230 Optical Mark Scoring Reader (test answer sheets), 1231/1232 Optical Mark Page Reader (data sheets), or 3881 Optical Mark Reader.

7) Preferred Character Set Feature (#5523) on the 1403 and Preferred Character Set Adapter (#5524) on the printer control unit are prerequisites. See Preferred Character Set Feature in 1403 "Machines."

8) The 1403 model 3 requires a separate 1416 Interchangeable Train Cartridge for each different printing arrangement. See 1416 in "Machines."

For "Specify" see next page.

OTHER THAN SYSTEM/360 -- 1403 AND 1404 PRINTERS

Specify: For plant installation --

[1] Based on printer being ordered, type style desired and system with which printer will be used, specify one Feature # from the above chart... if Interchangeable Chain Cartridge Adapter (#4740) is ordered, specify two Feature #s unless Numerical Print Feature (#5381) is also being ordered for 1403 model 1 or 2. With Numerical Print Feature, specify only one alphameric chain Feature # plus one Numeric Chain Feature # (see Note 4 above for Feature # and prerequisites). Important: Print Arrangement for 1403 model 3 must be specified on the 1416. If a PCS Arrangement is to be ordered for the 1416, see Notes 7 and 8 above for prerequisites.

[2] If desired, #9140 for enlarged dash (character No. 732464) in lieu of standard dash for printing on documents to be read by 1230, 1231, 1232 or 3881 optical mark readers. For 1403, see second paragraph of Note 3; for 1416, see second paragraph of Note 6.

[3] If desired, #9549 for slashed zero in lieu of standard zero in any arrangement except A4 and J4.

[4] If desired, #9676 for round alphabetic "O" in lieu of standard squared "O" in any arrangement except A4 and J4.

Specify: For field installation --

[1] If a new or additional print chain is desired, see "New Print Chains" below. For new or additional print trains for 1403 model 3, see 1416 Interchangeable Train Cartridge in "Machines." For field installation of #9140, #9549 or #9676, see the "Specify" section under "Substitute Characters."

New Print Chains: Additional, spare or replacement chains are available for either fixed or interchangeable cartridges used on the 1403 model 1, 2, 4, 5 or 6, and 1404 model 2.

	Feature #
Any one arrangement, chain only	5532

Note: If both chains supplied with Interchangeable Chain Cartridge Adapter (#4740) are to be changed, prices apply to each chain. If more than two interchangeable cartridges with chains are desired for a machine, or interchangeability with more than one machine is desired, consult Regional Special Equipment Engineering Department.

Specify: [1] #5532

[2] One Feature # for print arrangement desired... see "Print Chain/Train Arrangements" on previous page.

[3] If desired, #9140 for enlarged dash in lieu of standard dash for printing on documents to be read by 1230, 1231, 1232 or 3881 optical mark readers ... available in any arrangement A2-K2 or A3-K3.

[4] If desired, #9549 for slashed zero in lieu of standard zero in any arrangement except A4 and J4.

[5] If desired, #9676 for round alphabetic "O" in lieu of standard squared "O" in any arrangement except A4 and J4.

Substitute Characters: Whenever possible, a standard print arrangement should be specified. For available standard arrangements, see previous page. It is not feasible to make actual printing tests on non-standard characters. Therefore, printing and ribbon life from chains/trains with non-standard characters may be less satisfactory than results from a standard chain/train. It should also be noted that because of limitations of type face area (height, width, etc.), characters of the customer's design are subject to acceptance by the plant.

A substitute character is one which is ordered to displace a character in one of the standard arrangements. Standard characters may be rearranged, special characters may be selected from the type catalog, or characters of the customer's design may be substituted, subject to the above limitations.

Note: A substitute character assumes the card and bit codes of the character it replaces in the system to which the printer is attached.

Character substitutions may be ordered for plant or field installation on a print chain/train, subject to the following:

Artwork (#9950): A Service Charge will be made for designing a new character. Any character illustrated elsewhere in this section for the 1403, 1404, 1443, or 1445, or any character previously designed for these machines (except for "Limitations" below), may be substituted in any position of any type slug without charge for artwork.

Limitations: [1] The ABA E-13B type font can only be used on the 1445... [2] Characters from the SN5 and TN5 arrangements of the 1403 Printer (System/360) cannot be substituted in print arrangements used in other systems.

Matrix (#9951 and #9953): Each print chain type slug (1403 models 1, 2, 4, 5 and 6, and 1404) consists of two characters and requires one matrix (#9951). A Service Charge will be made for the matrix unless an identical 2-character matrix (same characters, in same positions) exists at the plant. This charge is in addition to that for Artwork.

Each print train type slug(for 1416 used on 1403 model 3) consists of three characters and requires one matrix (#9953). A Service Charge will be made for the matrix unless an identical 3-character matrix (same characters, in same positions) exists at the plant. This charge is in addition to that for Artwork.

Set-Up (#9952 for 1403 models 1, 2, 4, 5 and 6, and 1404... #9954 for 1416 used on 1403 model 3): In addition to charges for Artwork and Matrix (if applicable), a Service Charge applies each time a set-up is required to fabricate a special type slug. This charge is the same regardless of the quantity of identical slugs made at any one time. On re-orders of identical slugs, the set-up charge again applies.

Service Charges for Artwork, Matrix and Set-Up should be authorized on all orders for non-standard characters. The charge for Artwork need not be specified when character numbers from the illustrated catalog are ordered indicating that artwork is available. The plant will review all orders to determine if Artwork and Matrix are required. The Service Charges (even though authorized) will not be billed unless applicable.

1403 and 1404	Feature #
Artwork, per character	9950
Matrix, per slug (2 characters)	9951
Set-Up, for 2-character slug	9952

1416 (for 1403 model 3)	Feature #
Artwork, per character	9950
Matrix, per slug (3 characters)	9953
Set-Up, for 3-character slug	9954

Plant installation (original assembly of chain/train): Any standard type slug (size, font) can be specified in any desired arrangement at no extra charge. See page 31 for standard slug configurations in each print arrangement. Page 31 also lists the Character Position Numbers assigned to the graphics in each array of a chain/train. These should be used as a reference when making character substitutions since they coincide with the designations on the Type Specification Sheet (120-1089).

Multiple Machine Orders (identical type specs - plant installation): On a multiple machine order, the Service Charges for Artwork, Matrix and Set-Up apply only to the first machine.

Submit a separate Type Specification Sheet for each machine on a multiple machine order. Show Service Charges for Artwork, Matrix and Set-Up on one DPOW/IAC and its attached Type Specification Sheet, and indicate Feature #9695 (Special Type -- Multiple Machine Order) at no charge on all other DPOWs/IACs and their Type Specification Sheets. On the DPOW/IAC with Service Charges, cross reference all other Branch Office Order Numbers (Plant Order Numbers) to which the charges apply. On the DPOWs/IACs with "No Charge" Service Charges, indicate the Branch Office Order Number which specifies the charges. Note: This cross reference of order numbers is mandatory.

If an additional machine with identical type specs is ordered prior to shipment of a machine which carries the Service Charges, specify #9695 on the DPOW, reference the Plant Order Number which carries the Service Charges, and attach a Type Specification Sheet. (When the order is entered after shipment of the machine carrying the Service Charges, the Set-Up charge will apply.)

If a machine with #9695 specified at no charge is shipped before the machine specifying the Service Charges, the plant will transfer the charges to the machine which is shipped first and substitute "No Charge" on the other one.

For "Specify" see next page.

OTHER THAN SYSTEM/360 -- 1403 AND 1404 PRINTERS

Substitute Characters: (cont'd)

Specify: [1] Feature # of print arrangement which most closely resembles that desired by the customer.

[2] Feature #s and charges for Artwork, Matrix and Set-Up.

[3] Type Specification Sheet (120-1089) must accompany each order for substitute characters. Once a Type Specification Sheet has been submitted and additional characters are desired, a new Type Specification Sheet is required. It must include all characters desired... those previously ordered and the new ones.

Field installation: The prices apply to installation of standard type slugs (see page 31) or special type slugs (to which charges for Artwork, Matrix and Set-Up are to be added if applicable).

Print chains/trains are made up of a number of identical arrays of type slugs as described on page 31. When a modification is made to a slug in one array, corresponding type slugs must be changed in all identical arrays. The prices apply to special chains with other than 5 or 15 identical arrays and special print trains with other than 5 identical arrays.

Type Slug Substitutions (on any one chain or train):	Feature #
1403 model 1, 2, 4, 5 or 6, or 1404 model 2	
First type slug	8371
Each additional slug, at same time	8372
1416 (1403 model 3)	
First type slug	8373
Each additional slug, at same time	8374

Specify: [1] Feature # of installed chain/train which is to be modified.

[2] Applicable Feature #s and charges for Artwork, Matrix and Set-Up.

[3] Feature #s and charges for type slug substitutions. Type slugs (#8371 and #8372, or #8373 and #8374) may be ordered on MES with Type Specification Sheet (120-1089) attached for any of the following:

	Type Catalog Character Number	
	.095" Type Size	.079" Type Size
Enlarged dash in lieu of standard dash (Arrangements A2-K2, A3-K3 only)	732464	732464
Round alphabetic "O" in lieu of standard squared "O" (Any arrangement except A4 and J4)	251839	475504
Slashed zero in lieu of standard zero (Any arrangement except A4 and J4)	474129	475539

[4] Type Specification Sheet (120-1089) must accompany each order for substitute characters.

Note: If a new or additional print chain is desired for field installation, see "New Print Chains" on one of the previous pages. For new or additional print trains, see 1416 in "Machines."

OTHER THAN SYSTEM/360 -- 1443 PRINTER MODELS 1 and 2

One of the 52-character sets indicated in the charts below is standard on the 1443 models 1 and 2. Special characters with their corresponding card codes and BCD bit codes are shown for all character sets.

For 1240/1440 Systems, where two characters are shown under the 52-character set, the one on the left is for Arrangement A, the other for H.

1240/1440 Data Processing System

Graphics normally associated with the BCD code are those shown under the 63-character set.

Card Code	BCD Code	13	39	52 A H	63
12-8-3	B A 8 2 1	.	.	.	.
12-8-4	C B A 8 4			¤)	¤
12-8-5	B A 8 4 1				[
12-8-6	B A 8 4 2				<
12-8-7	C B A 8 4 2 1				≢
12	C B A			& +	&
11-8-3	C B 8 2 1		$	$	$
11-8-4	B 8 4	*		*	*
11-8-5	C B 8 4 1				]
11-8-6	C B 8 4 2				;
11-8-7	B 8 4 2 1				Δ
11	B	-		-	-
0-1	C A 1			/	/
0-8-3	C A 8 2 1		,	,	,
0-8-4	A 8 4			% (	%
0-8-5	C A 8 4 1				∨
0-8-6	C A 8 4 2				\
0-8-7	A 8 4 2 1				⇏
8-2	A			¢	¢
8-3	8 2 1			# =	#
8-4	C 8 4			" '	⁄
8-5	8 4 1			:	:
8-6	8 4 2				>
8-7	C 8 4 2 1				∀
12-0	C B A 8 2			?	?
11-0	B 8 2			!	!
0-8-2	A 8 2			≠	≠

On an initial order, the 63-character set may be specified at no charge in lieu of the 52-character set, if Selective Character Set (#6401) is ordered. The Feature #s indicated to the right apply to plant installation. →

System	Print Arrangements - Feature #s					
	52-Character Sets				63-Character Sets	
	A	H	K	—	A	—
1240/1440	9601	9608			9600	

Specify: From the above chart, for plant installation

[1] For 1240/1440, one Feature# for standard 52-character set unless Selective Character Set (#6401) is ordered and the 63-character set is desired in lieu of the 52-character set.

[2] Type Size -- #9731 for .079", or #9733 for .095".

[3] If desired, #9140 for enlarged dash (character No. 830704) in lieu of standard dash. Used for printing on documents to be read by 1230, 1231, 1232 or 3881 optical mark readers. Available as substitution in either 52- or 63-character set.

[4] If desired, #9676 for round alphabetic "O" in lieu of standard squared "O" in 39-, 52- or 63-character set.

[5] If desired, #9549 for slashed zero in lieu of standard zero in any character set.

Character Sets: Type bars are available with 13-, 39-, 52- and 63-character sets as indicated below. All sets are alphameric except the 13-character set which is numeric only. The format of standard segments included in each character set is illustrated. The quantity of identical segments included in a 120 print position type bar is also shown... for 144 print positions (circled items below), see Note (2) below.

Standard Segment Formats - 1240/1440

Segment Number	Character Position Number												Character Sets					
	1	2	3	4	5	6	7	8	9	10	11	12	13	13(A)	39(A)	52(A)	52(H)	52(K)	63(A)
1	1	2	3	4	5	6	7	8	9	0	.	*	-	(11)					
2	,	.	$	1	A	J	2	S	B	K	3	T	C		5				
3	L	4	U	D	M	5	V	E	N	6	W	F	0		(4)	4	4	4	3
4	7	X	G	P	8	Y	H	Q	9	Z	I	R	0		4	(3)	(3)	(3)	3
5	&	-	1	/	A	J	2	S	B	K	3	T	C			4			(3)
6	≠	?	!	#	,	.	$	¢	%	¤	*	:	ß			3			
7	+	-	1	/	A	J	2	S	B	K	3	T	C				4	4	
8	≠	?	!	=	,	.	$	'	(	)	*	:	ß				3		
9	≠	?	!	#	,	.	$	¢	%	¤	*	:	Y						3
10	[	]	>	\	<	;	f	**	#	Δ			ß						3
11	≠	?	!	=	,	.	$	¢	(	)	*	:	ß					3	

Notes

1) For a machine with 144 print positions, add one segment to any figure circled for a 13-, 39-, 52- or 63-character set. For example, the 13-character set has eleven segments (all No. 1 or 81, depending on the system) for 120 print positions, but twelve such segments for 144 positions. The 39-character set has four No. 3 (or No. 83) segments for 120 positions, but five for 144 positions. Similar determinations can be made for the other character sets.

2) Zero appears in Position 10 of Segment No. 1 (or No. 81) and in Position No. 13 of Segment No. 4 (or No. 84).

3) Alphabetic "O" is in Position 13 of Segment No. 3 (or No. 83). It is squared slightly to distinguish it from numeric zero.

4) Positions 11 and 12 of Segment Nos. 10 and 88 are blank. These positions cannot be used for substitute characters.

Additional Character Sets:

Character Set	1240/1440
13	#1890
39	1891
52	1892
63	1893

Specify: [1] From the above, Feature #(s) for additional character set(s) desired. Note: Selective Character Set (#6401) is prerequisite for all except 52-character sets (see 1443 in "Machines").

[2] For 52-character set, #9601 for Arrangement A, or #9608 for Arrangement H.

[3] #9495 for 120 print positions, or #9496 for 144 print positions (24 Additional Print Positions, #5559, is prerequisite for #9496).

[4] Model of 1443 on which type bar(s) will be used, #9729 for model 1, or #9730 for model 2.

[5] Type Size, #9731 for .079", or #9733 for .095".

[6] If desired, #9140 for enlarged dash (character No. 830704) in lieu of standard dash. Used for printing on documents to be read by 1230, 1231, 1232 or 3881 optical mark readers. Avaialable only as substitution in 52- and 63-character sets.

[7] If desired, #9676 for round alphabetic "O" in lieu of standard squared "O" in 39-, 52- or 63-character set.

[8] If desired, #9549 for slashed zero in lieu of standard zero in any character set.

Substitute Characters: A substitute character is one which is ordered to displace a character in one of the standard segments illustrated above. Note: A substitute character assumes the card and bit codes of the character it replaces in the system to which the printer is attached.

Substitute characters may be ordered subject to the following:

Artwork (#9950): A Service Charge will be made for designing a new character. Any character illustrated elsewhere in this section for the 1403, 1404, 1443, or 1445, or any character previously designed for these machines (except for "Limitations" below), may be substituted in any segment format without charge for artwork.

Limitations: [1] The ABA E-13B type font can only be used on the 1445... [2] Characters from the SN5 and TN5 arrangements of the 1403 Printer in System/360 cannot be used on the 1443.

Matrix (#9951): Each character requires a matrix. A Service Charge will be made for the matrix unless an identical matrix exists at the plant. This charge is in addition to that for Artwork. Note: 1445 matrices cannot be used to fabricate 1443 segments, or vice versa.

Set-Up (#9952): In addition to charges for Artwork and Matrix (if applicable), a Service Charge applies each time a set-up is required to fabricate a segment format other than those illustrated. This Service Charge is the same regardless of the quantity of identical segments made at any one time. On re-orders of identical segments, the set-up charge again applies.

Segment (#6404): Each character set consists of multiples of one or more segments. The quantity of identical segments in a character set is indicated in the charts under "Character Sets." In addition to applicable Service Charges , a charge applies for each non-standard segment required to complete a character set... it applies only when an installed type bar is to be modified.

Note: When 24 Additional Print Positions (#5559) is installed, one additional segment is required in a character set. See Note (2) under "Character Sets" above... also see #5559 under 1443 in "Machines."

Service Charges for Artwork, Matrix and Set-Up should be authorized on all orders for non-standard characters. The charges for Artwork need not be specified when character numbers from the illustrated catalog are ordered indicating that artwork is available. The plant will review all orders to determine if Artwork and Matrix are required. The Service Charges (even though authorized) will not be billed unless applicable.

Description	Feature #
Artwork, per character	9950
Matrix, per character	9951
Set-Up, for each different segment format	9952
Segment (field installation)	6404

OTHER THAN SYSTEM/360 -- 1443 PRINTER MODELS 1 AND 2 (cont'd)

Substitute Characters: (cont'd)

Multiple Machine Orders (identical type specs - plant installation): On a multiple machine order, the Service Charges for Artwork, Matrix and Set-up apply only to the first machine and are to be entered for that machine order only.

For additional machines with all specs identical (including type), enter quantity of machines and specify =9695 (Special Type - Multiple Machine Order) at no charge. Once Plant Order numbers are assigned, enter the following under "Remarks":

On first machine order, indicate that Service Charges for special type also cover all other Plant Order numbers:

Example: SVC CHGS FOR SPEC TYPE COVER
E12341 E12342 E12343 E12344
E12345

On each additional machine order, indicate Plant Order number (first machine) which carries Service Charges:

Example: SVC CHGS FOR SPEC TYPE ON
E12340

A separate Type Spec Sheet is required for each machine and must be sent to the plant with sufficient lead time for the manufacturing schedule.

The Type Spec Sheet for the first machine must include the Service Charges as entered on that machine order plus a transmittal (memo) listing the Plant Order numbers of all additional machines involved. The spec sheet for each additional machine must indicate the Plant Order number of the machine which carries the Service Charges. (This may be written in the money fields of the Spec Sheet as "Service Charges on P.O. (insert number).")

Note: This cross reference of Plant Order numbers is mandatory on machine orders and Type Spec Sheets.

If an additional machine with identical type specs is ordered prior to shipment of a machine which carries the Service Charges, specify =9695 on the AAS order, and indicate under "Remarks" the Plant Order number which carries the Service Charges. Send a Type Spec Sheet to the plant indicating the Plant Order number which carries the Service Charges. (When the order is entered after shipment of the machine carrying the Service Charges, the Set-up charge will apply.)

If a machine with =9695 specified at no charge is shipped before the machine specifying the Service Charges, the plant will transfer the charges to the machine which is shipped first and substitute "No Charge" on the other one.

Specify: [1] 1443/2203 Type Specification Sheet (120-0658) must accompany each order for substitute characters. Once a Type Specification Sheet has been submitted and additional characters are desired, a new Type Specification Sheet is required. It must include all characters desired... those previously ordered and the new ones.

[2] Type Size, =9731 for .079" or =9733 for .095".

[3] Segments (=6404) may be ordered on MES with Type Specification Sheet attached for any of the following:

	Type Catalog Character Number	
	.095" Type Size	.079" Type Size
Enlarged Dash (in lieu of standard dash) in 52- or 63-character set . .	830704	830704
Round alphabetic "O" in lieu of standard squared "O" in 39-, 52-, or 63-character set	251839	475504
Slashed zero in lieu of standard zero in any character set	474129	475539

Examples of Charges for Substitute Characters

New Additional Type Bar: A rental customer wants a new additional type bar with ⌀ in lieu of @ in Arrangement A of the 52-character set for a 1443 model 1 with 120 print positions. The chart on the previous page indicates that this affects Position 8 of Segment No. 6.

Specifications

One 1443 Type Bar, 52-character set (#1892), Arrangement A (#9601) for 1443 model 1 (#9729) with 120 print positions (#9495), type size .095" (#9733)
Artwork (#9950) for one new character
Matrix (#9951) for this character
Set-Up (#9952) for Segment No. 6 with ⌀ in lieu of @ in Position 8

Note: The Segment charge (#6404) does not apply since a complete type bar is being furnished with three special segments in lieu of the once of standard Segment No. 6 format. For a customer owned machine, the same total charge would apply with a Puchase Price in lieu of the Single Use-Charge.

Installed Type Bar: A purchase customer orders a closing parenthesis ")" substituted for the ampersand "&" in a 63-character set of a 1443 model 2 with 120 print positions. The chart on one of the previous pages indicates that this affects Position 1 of Segment No. 5.

Specifications [Note: The ")" is an available character in Segment No. 8.]

Artwork (#9950)
Matrix (#9951)
Set-Up (#9952) for Segment No. 5 with ")" in lieu of "&" in Position 1
Three special segments (#6404), to replace corresponding quantity of Segment No. 5 in 63-character set type bar (#1893), of 1443 model 2 (#9730) with 120 print positions (#9495), type size .095" (#9733)

Note: For a rental customer, the same total charge would apply with a Single Use-Charge in lieu of the Purchase Price.

For 144 print positions, one additional special segment would be required at an additional Purchase Price (Single Use-Charge for rental customer).

Change of Type Size: To change type size on an installed machine, attach 1443 Type Specification Sheet (120-0658) to MES ordering the required number of Segments (#6404).

(reverse is blank)

THIS PAGE LEFT INTENTIONALLY BLANK

ILLUSTRATED TYPE CATALOG - 1403, 1404, 1443

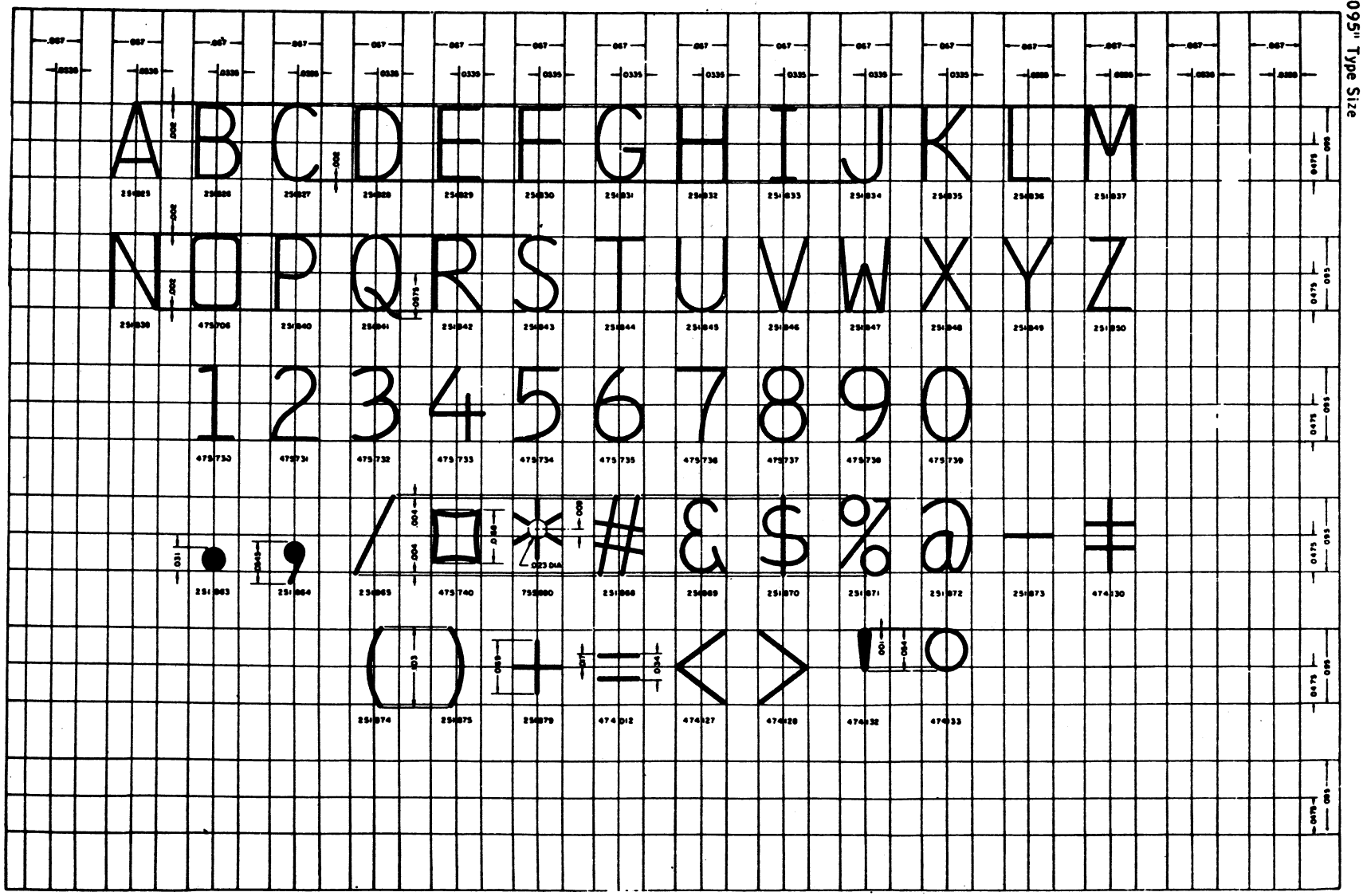
IMPORTANT

The characters illustrated on the following pages do not necessarily represent the final appearance of the printed characters in every detail. This is because they are made from drawings (original artwork) of the characters and not from actual print samples. Dimensions shown are approximate and are not the final dimensions of the printed characters. Final dimensions will be somewhat larger and they will vary depending upon the characteristics of the ribbon and paper used.

The reproductions are approximately five times actual type size. Each character is assigned a "character number" which appears directly below its illustration.

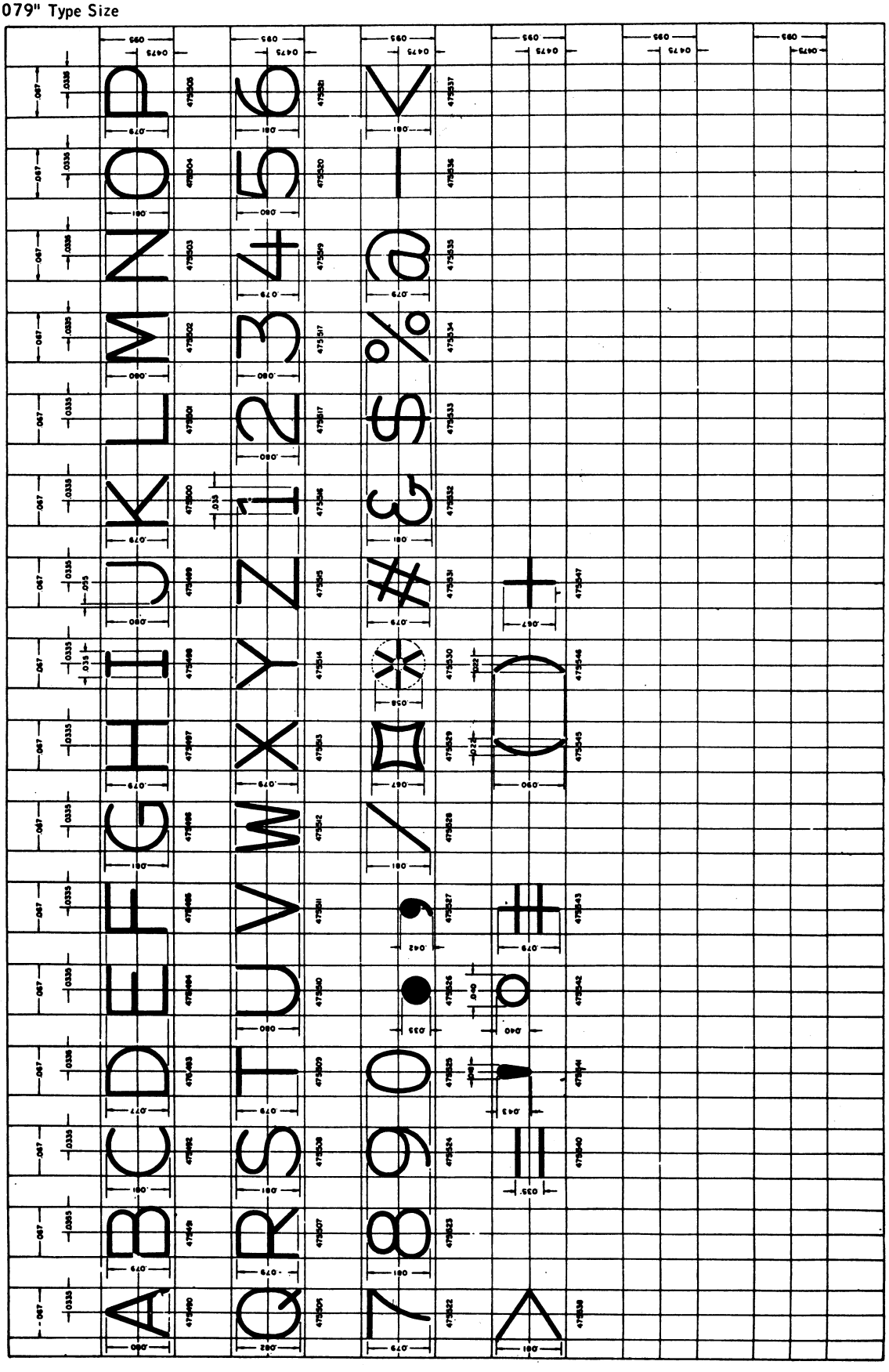
For the 1403, 1404 and 1443, IBM furnished two effective character heights, .095" and .079". Certain characters will vary slightly from these effective character heights in order to maintain proper printing appearance.

For the 1403 (all models) and 1404, the characters illustrated below are listed as "Standard Type Style"... on the 1443 it is commonly referred to as .095" Type Size. All alphameric and special characters of Arrangements A-K are shown. For those included in any specific arrangement, see "Special Character Arrangements" under 1403, 1404 or 1443 elsewhere in this section. Note: All special characters in the 52- and 63-character sets of the 1443 are not shown...they will be included in a subsequent revision.



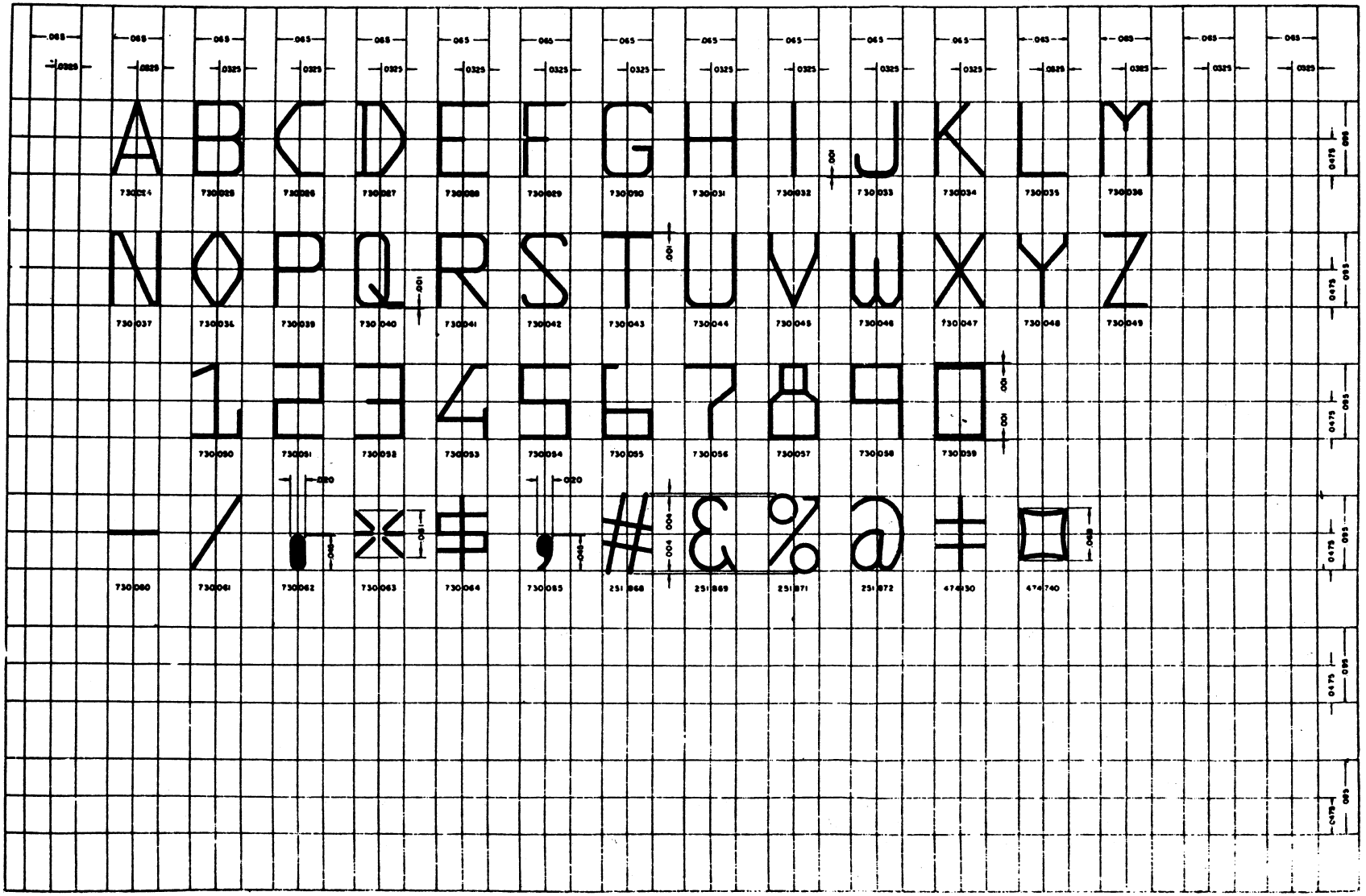
1403, 1404, 1443 - .079" Type Size

For the 1403 (models 1,2,4 and 5) and 1404, the following characters are listed as "Alternate Type Style"... on the 1443 it is commonly referred to as .079" Type Size. All alphameric and special characters of Arrangements A-K are shown. For those included in any specific arrangement, see "Special Character Arrangements" under 1403, 1404 or 1443 elsewhere in this section. Note: All special characters in the 52- and 63-character sets of the 1443 are not shown... they will be included in a subsequent revision.



For the 1403 (models 1, 2, 4 and 5), the following characters are listed as "1428 Type Style." This type font must be used for optical character recognition by the 1428 Alphameric Optical Reader. All alphameric and special characters of Arrangement A are shown. Type size is approximately .095" high. The 1428 will optically recognize the alphabet and numbers but only the following special characters: Period . Comma , Diagonal / Asterisk * Dollar Sign $ Dash -

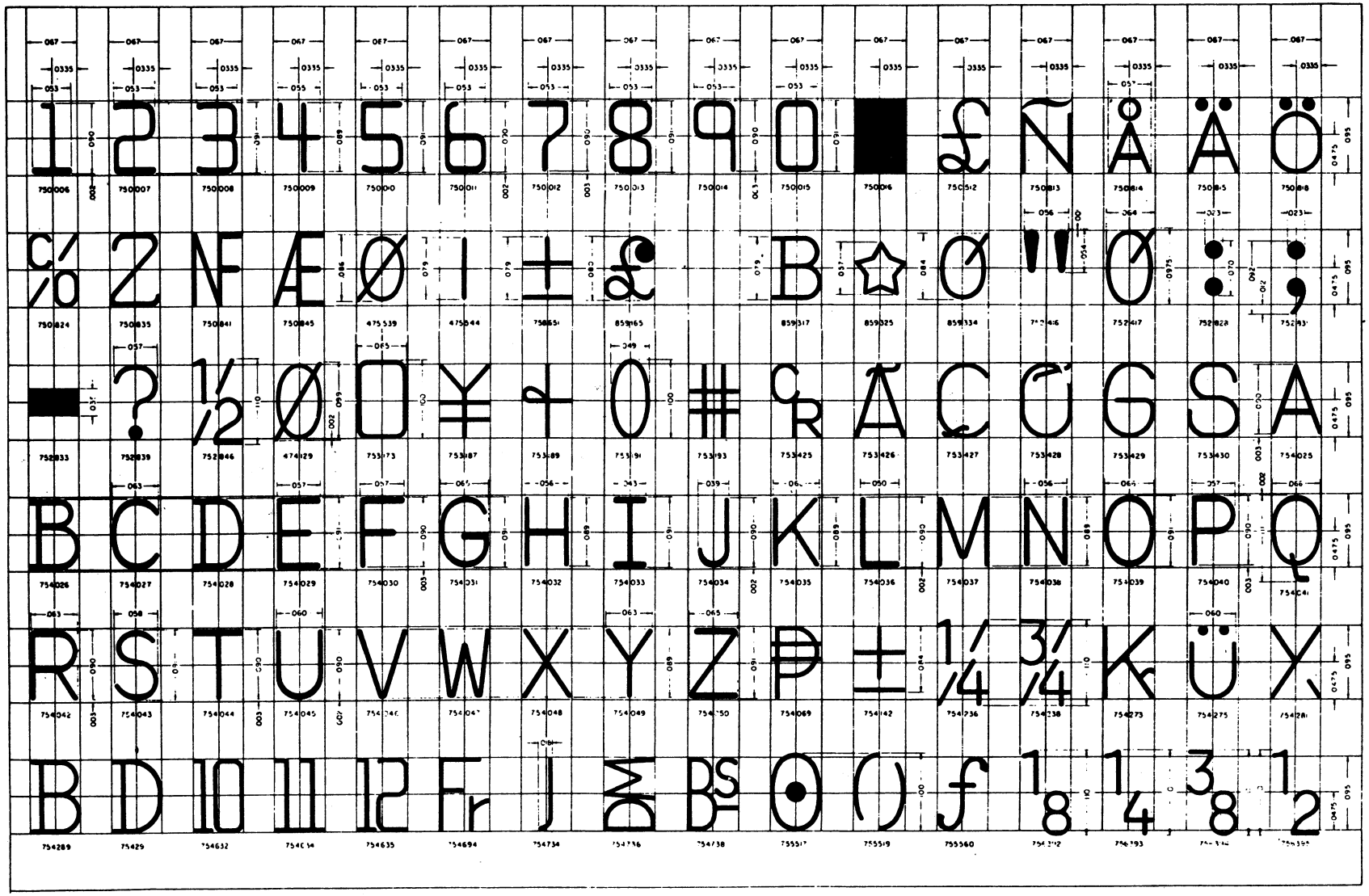
Arrangement J is required on a 1403 model 1, 2, 4 or 5, or 1404 model 2, if printed output is to be optically recognized by a 1282 Optical Reader Card Punch. Arrangement J is identical to Arrangement A except for a + in lieu of the &. The character number for the + is 251879 (illustrated on the page of .095" Type Size). The 1282 will optically recognize only numeric characters 0-9 and special characters – and +.



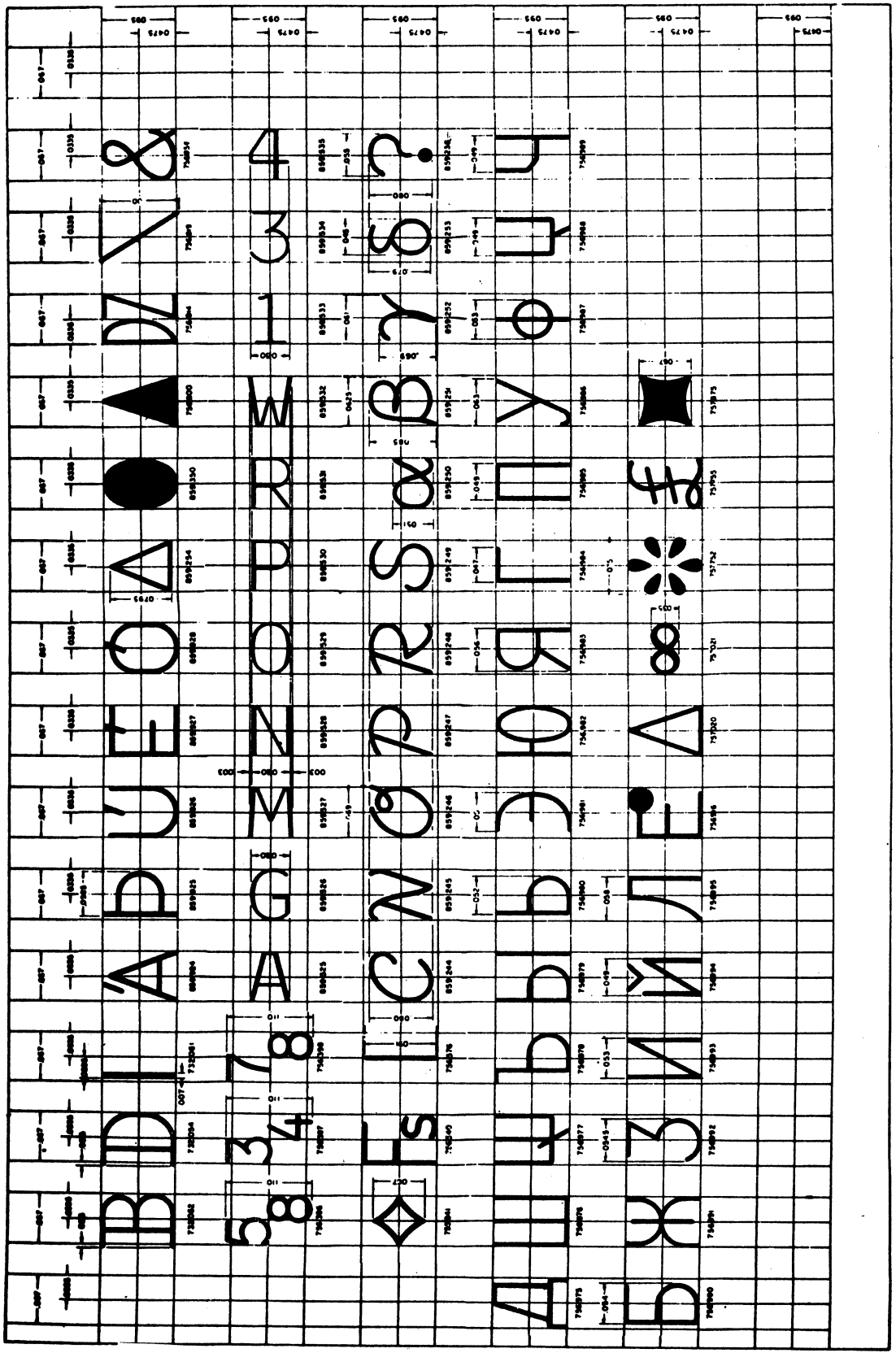
The following illustrations represent selected non-standard characters for which artwork has been completed. Special plotting characters are displayed on the last page of illustrations. The illustrations do not necessarily represent the final appearance of the printed characters in every detail. This is because they are made from drawings (original artwork) of the characters and not from actual print samples. Dimensions shown are approximate and are not the final dimensions of the printed characters. Final dimensions will vary depending upon characteristics of the ribbon and paper used. The reproductions are approximately five times actual type size. Each character is assigned a "character number" which appears directly below its illustration.

When the configuration of a character exceeds the normal over-all dimensions of .067" wide and .095" high, or where lines are close together, the characters may not print with regular acceptable clarity.

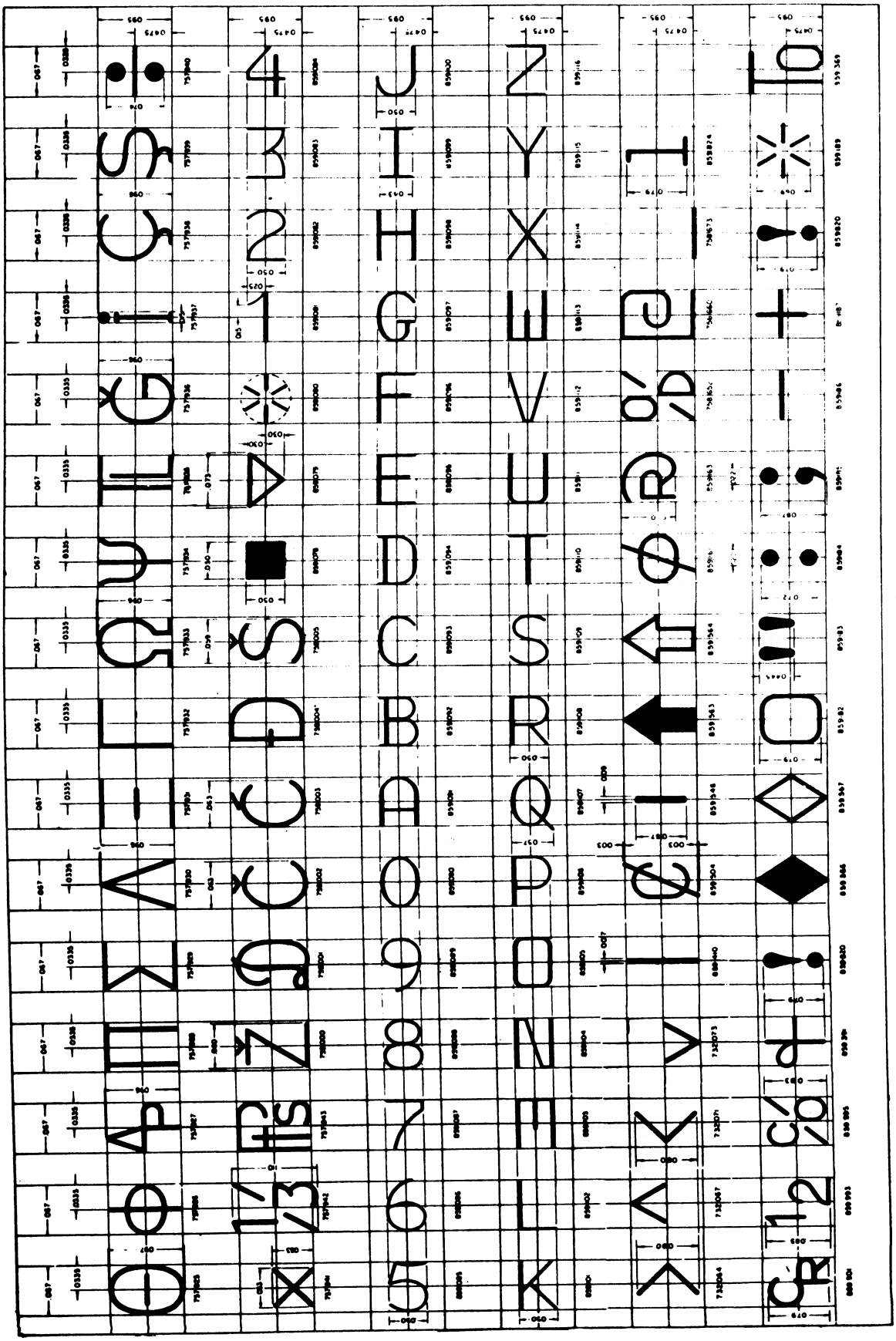
For 1403 (models 1,2,4 and 5) and 1404, 2-character matrices are available for many combinations of the characters illustrated. Matrices are also available where one of these characters has been paired with a standard character.



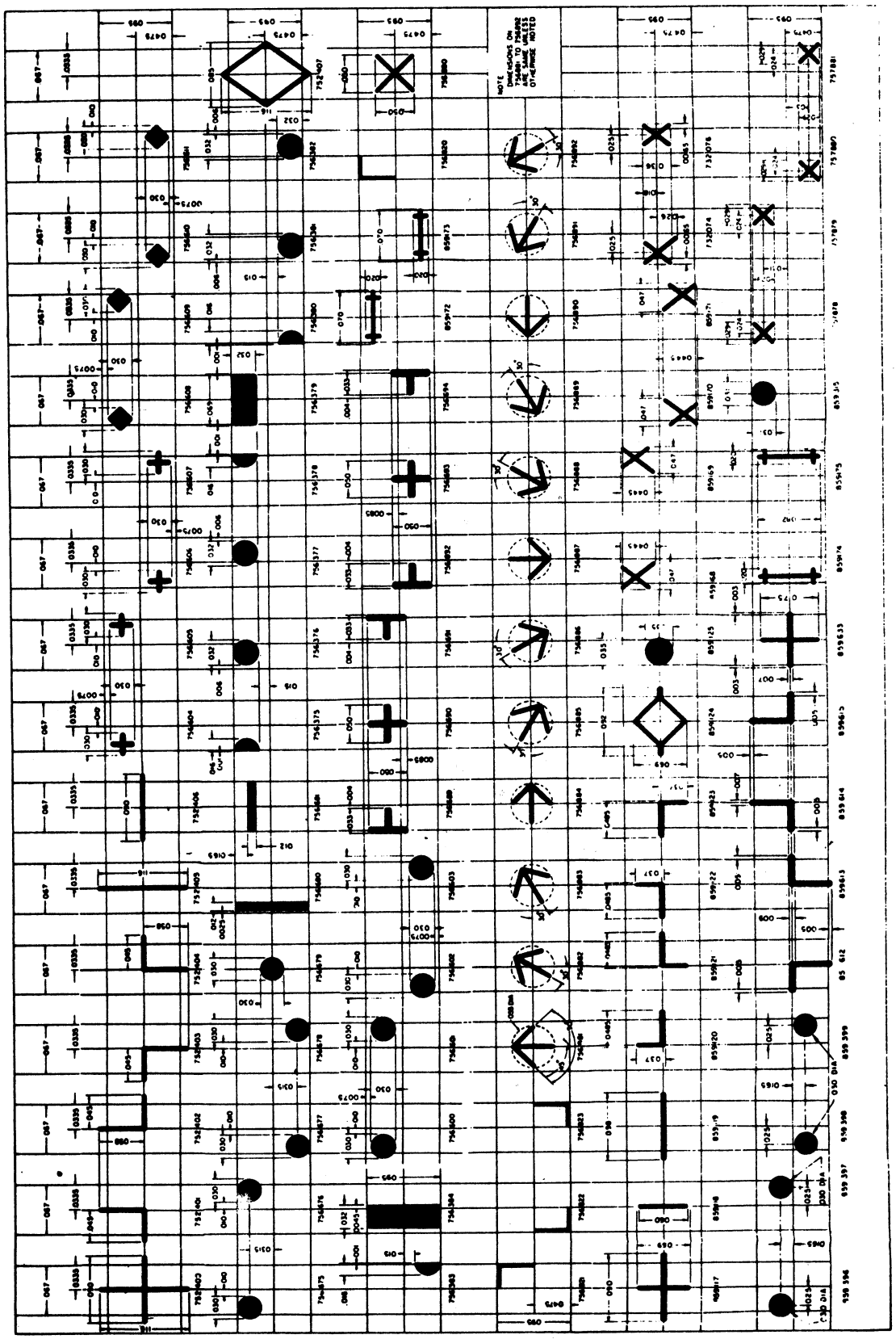
1403, 1404, 1443 - Non-standard Characters (cont'd)



1403, 1404, 1443 - Non-standard Characters (cont'd)



1403, 1404, 1443 Non-standard Characters (cont'd)



SYSTEM/360, SYSTEM/370 and 4300 PROCESSORS -- 1403 and 1404 PRINTERS

Either an AN or HN arrangement (48-character set) is standard on the 1403 model 2 or 7, on the 1404, and on the 1416 (1403 model 3 or N1).

1403 model 2 -- All other arrangements except OAA, OAB, ODA and ONA require the Universal Character Set Feature (Multiple Character Set Feature if printer is attached to 2025 Processing Unit of System/360 model 25).

1403 model 7 -- The only other arrangements available are OAA, OAB, ODA and ONA.

1403 model 3 or N1 -- All other arrangements except ODA and ONA require the Universal Character Set Feature (Multiple Character Set Feature if 1403 N1 is natively attached to 2025 Processing Unit of System/360 model 25).

1404 -- No other arrangements are available.

The chart below shows EBCDIC card and bit codes assigned to special characters included in all print arrangements except SN, TN and ALA. For SN, TN and ALA graphics and their associated EBCDIC card and bit codes, see 1403 SRL (GA24-3073).

The graphics/codes assigned to the PN, QNC and QN arrangements constitute the PL/I language (59 characters) plus the quotation mark symbol.

EBCDIC		Arrangements and Number of Graphics									
80-column Card Code	Bit Code	AN, ODA PCS-AN (48)	ONA (48)	OAA (48)	OAB (48)	HN PCS-HN (48)	PN, QN QNC (60)	RN (52)	XN (1403-2) (40)	YN (1416) (42)	GN (63)
12-8-2	0100 1010										[
12-8-3	1011	.	.	.	.	.	.	.	.	.	.
12-8-4	1100	¤	¤	<	<		<	¤			<
12-8-5	1101					(	(	(			(
12-8-6	1110	+	+	+	+	+	+	+			+
12-8-7	1111						|				|
12	0101 0000	&	&	&	&	&	&	&			&
11-8-2	1010										]
11-8-3	1011	$	$	$	$	$	$	$	$	$	$
11-8-4	1100	*	*	*	*	*	*	*	*	*	*
11-8-5	1101					)	)	)			)
11-8-6	1110						;				;
11-8-7	1111						¬				¬
11	0110 0000	-	-	-	-	-	-	-		-	-
0-1	0001	/	/	/	/	/	/	/			/
0-8-3	1011	,	,	,	,	,	,	,	,	,	,
0-8-4	1100	%	%	%			%	%			%
0-8-5	1101						_				_
0-8-6	1110				>		>				>
0-8-7	1111						?				?
8-2	0111 1010						:				:
8-3	1011	#	#	#			#	#		#	#
8-4	1100	@	@	@			@	@			@
8-5	1101				'	'	'	'			'
8-6	1110				=	=	=	=			=
8-7	1111						"				"
0-8-2	1110 0000										\

Nominal printing speeds for all available arrangements are listed below. "Nominal" speed is a weighted average of mean expected value when the train or chain arrangement is performing typical printing operations.

Arrangement	Character Set	Nominal Printing Speed - Lines per Minute			
		1403 model 2	1403 model 3 or N1	1403 model 7	1404 model 2
ALA	162 graphics, 78 preferred	---	560/310*	---	---
AN	48 "A" graphics	600	1100	600	600
HN	48 "H" graphics	600	1100	600	600
OAA (representative of OCR-A - alphameric)	5 "A" graphics + 43 OCR-A	600	1100	600	---
OAB (representative of OCR-B - alphameric)	48 (representative of OCR-B graphics)	600	1100	600	---
ODA (representative of OCR-A - numeric)	38 "A" graphics + OCR-A numeric	600	1100	600	---
ONA (representative of OCR-A - numeric)	35 "A" graphics + OCR-A numeric and 3 special characters	600	1100	600	---
GN (ASCII)	3-level set, 63 graphics	500/390/140	955/775/310	---	---
PCS-AN (Preferred Character Set))	3-level set, 48 "A" graphics	750/500/270	1400/955/560	---	---
PCS-HN (Preferred Character Set)	3-level set, 48 "H" graphics	750/500/270	1400/955/560	---	---
PN (PL/I)	60 graphics	500	955	---	---
QNC (PL/I - Commercially Preferred)	60 graphics, 45 preferred	---	1110/310	---	---
QN (PL/I - Scientifically Preferred)	60 graphics, 45 preferred	600/140	1110/310	---	---
RN (FORTRAN/COBOL Commercial)	52 graphics, 47 preferred	600/140	1110/310	---	---
SN (Text Printing - Commercial)	84 graphics, 78 preferred	390/140	775/310	---	---
TN (Text Printing - Scientific)	120 graphics	270	560	---	---
XN (High Speed Alphameric)	40 graphics	690	---	---	---
YN (High Speed Alphameric)	42 graphics, 39 preferred	---	1250/560	---	---

*When printing diacritical marks over or under alphabetic characters an additional print cycle is required, resulting in reduced throughput.

SYSTEM/360, SYSTEM/370 and 4300 PROCESSORS -- 1403 and 1404 PRINTERS (cont'd)

Universal Character Set: See 1403 SRL (GA24-3073) for formulas which facilitate calculation of speeds for specific applications or custom designed character sets... including absolute minimum values. The nominal speed is dependent upon the frequency with which the various subsets in a preferred character set are printed. For example, the PCS-AN arrangement consists of 48 different graphics arranged in a sequence so that some of the characters occur more frequently than others:

48 graphics -- 3-level preferred set	PCS-AN graphics
Characters of primary preference appearing 8 times	0-9 . , - *
Characters of secondary preference appearing 4 times	A-Z ¤ $ / +
Characters of least preference appearing twice	% # @ &

The speeds at which graphics in each of the three levels of preference are printed are included in the table on the previous page.

The Universal Character Set Feature is required on the 1403 model 2 for use of any arrangement other than AN, HN, OAA, ODA and ONA. It is also required on the 1403 model 3 or N1 for any arrangement other than AN, HN, ODA and ONA. Note: With the UCS Feature, speeds of 750 lpm (1403 model 2) and 1400 lpm (1403 model 3 or N1) are theoretically achievable with any arrangement, depending on the data being printed.

AN and HN chains/trains have identical graphics except for four graphics which are exclusive to each arrangement as follows:

Chain/Train Character Position No.	AN Arrangement			HN Arrangement		
	Graphic	Card Code	Bit Code	Graphic	Card Code	Bit Code
48	¤	12-8-4	0100 1100	)	11-8-5	0101 1101
24	%	0-8-4	0110 1100	(	12-8-5	0100 1101
12	@	8-4	0111 1100	'	8-5	0111 1101
11	#	8-3	0111 1011	=	8-6	0111 1110

With an HN chain/train installed, if a code for one of the above AN graphics is presented to the printer, the HN graphic of the associated character position will print. Conversely, if the code for an HN graphic is presented to a printer equipped with an AN chain/train, the AN graphic of the associated character position will print. In other words, these AN and HN graphics are dualed automatically.

It is recommended that the 12-8-4 (0100 1100) code be used for the ¤ only in arrangements not containing the < symbol. In EBCDIC, the < is assigned 12-8-4 (0100 1100). If a ¤ is to be used in an arrangement which also contains the < symbol, it is recommended that the ¤ be assigned a 12-11-8-4 (1011 1100) code.

For Arrangement OAA or ONA, recommended coding of the hook, fork and chair graphics are shown under "OCR Fonts" below.

Multiple Character Set: All arrangements listed on the previous page will operate with the Multiple Character Set Feature installed on a 1403 model 2 or N1 when natively attached to a 2025 (System/360 model 25). The Multiple Character Set Feature is required on the 1403 model 2 for use of any arrangement other than AN, HN, OAA, ODA and ONA. It is also required on the 1403 model N1 for any arrangement other than AN, HN, ODA and ONA. For each arrangement, the nominal printing speed is listed. (See S/360 model 25 SRL, GA24-3510, for formulas which facilitate calculation of speeds for specific applications or custom designed character sets... including absolute minimum values.)

Note: The Multiple Character Set Feature or the Universal Character Set Feature on the 1403 provides the same function when the printer is attached to the 2025 Processing Unit via the Integrated 1403 Attachment (#4590).

Only the AN, HN, OAA, ODA, ONA, PN, TN and XN arrangements will operate at speeds equivalent to those listed on the previous page. Other arrangements, with preferred graphics in non-repeatable sets, will result in speed degradation. In these other arrangements, characters of least preference dictate the printing speed. Consequently, only the lowest nominal printing speed applies to a 1403 model 2 or N1 natively attached to the 2025 Processing Unit; i.e., with an RN arrangement on a 1403 model 2, the nominal printing speed is 140 lines per minute... with RN on 1403 model N1, nominal printing speed is 310 lines per minute.

For Arrangement OAA or ONA, recommended coding of the hook, fork and chair graphics are shown under "OCR Fonts" below.

Printing for Optical Character Reading: ECA No. 42, B/M 5870287, is required on any 1403 which will be equipped with a chain/train to prepare documents for optical reading by a 1282, 1287, 1288, 1418, 1428 or 3886.

OCR Fonts: OCR-A Font, Size 1 and OCR-B Font, Size 1 -- IBM print chains/trains are available for printing numeric, alphabetic and certain special characters which are representative of OCR-A and OCR-B Fonts. The optically readable characters of these arrays were designed to be representative of (but not always identical to) the mean character (shape) centerline described in the "United States of America Standard Character Set for Optical Character Recognition, Size A, USAS X3.17-1966" for OCR-A font (also referred to as ANSCS OCR) and the "European Computer Manufacturers Association's Standard ECMA-11 for Alphanumeric Character Set OCR-B for Optical Recognition 2nd Edition, October, 1971" for OCR-B font. Documents printed by a 1403 chain/train can be read by the 1287, 1288 and 3886 optical readers as indicated on the "Machines" pages. It must be recognized that parameters are subject to variations, and that deviations from specified limits may occur in bulk printing on 1403 printers.

Print speeds for the following arrangements are indicated on TC 71.1. No change to Programming Systems support is required.

Arrangement OAA (#9710) -- Contains letters A-Z, digits 0-9, and special characters /-.,*$% of OCR-A, Size 1, and # @ % + < of standard (.095") 1403 type style. Because of the repositioning of optical graphics (characters) on print trains (1416), the 1403 must be equipped with either the Universal Character Set Feature (#8640) or Multiple Character Set Feature (#5111) depending on the 1403 model and S/360 or S/370 model involved.

In the OAA arrangement, either one (but not both) of the following may be specified for the character substitution(s) indicated:

#9711 ¤ in place of <

#9712 { ⑀ in place of < ; ⑂ in place of + ; ⑁ in place of % }

If desired, #9728 (Timing Mark dash) may be specified in place of #.

Arrangement ODA (#9701) -- Contains the same graphics as the AN arrangement except digits 0-9 are replaced by the corresponding digits of OCR-A, Size 1.

Arrangement ONA (#9702) -- Same as ODA but ¤ + % are replaced by ⑀ ⑂ ⑁ (respectively) of OCR-A, Size 1.

When the Universal Character Set or Multiple Character Set Feature is used with the ONA arrangement, or OAA arrangement equipped with ⑀ ⑂ ⑁ graphics, it is recommended that these graphics be coded as follows:

Graphic	Card Code	Bit Code
⑀	12-0-9-8-4	1100 1100
⑂	12-0-9-8-6	1100 1110
⑁	11-0-9-8-4	1110 1100

Arrangement OAB (#9713) -- Contains letters A-Z, digits 0-9, and special characters . < + % $ - / , > ' = * of OCR-B font, Size 1. Because of repositioning of optical graphics (characters) in the print train (1416), the 1403 must be equipped with either the Universal Character Set Feature (#8640) or Multiple Character Set Feature (#5111) depending on the 1403 and the system involved.

In the OAB arrangement, the following may be specified for the character substitution indicated:

#9729 -- Timing Mark dash in place of > .

SYSTEM/360, SYSTEM/370 and 4300 PROCESSORS -- 1403 and 1404 PRINTERS (cont'd)

Print Chain/Train Arrangements

Print Arrangements are assigned an alphabetic designation (AN, HN, PCS-AN, etc.). Except for the OCR arrangements, the type size or style is designated by a numeric suffix (AN2, HN3, AN4, etc.), with 2 = .095" type size; 3 = .079" type size; 4 = 1428 Type Style; 5 = Text Type Style; and 6 = Library Type Style. Based on this coding, print chains/trains are assigned Feature #s as indicated below for each available arrangement.

S/360	S/370	Printer	Standard Type Style .095"	Feat.#	Alternate Type Style .079"	Feat.#	OCR-A Applications Size 1	Feat.#	OCR-B Applications Size 1	Feat.#	1428 Type Style OCR	Feat.#	Text Type Style Text Prt.	Feat.#	Library Type Style Lib. Prt.	Feat.#	Reference
25 thru 85 and 195	3031 thru 3195	1403 mdl 2	AN2	9612	AN3	9613					AN4	9621					Note 1
			HN2	9614	HN3	9615											
							OAA	9710	OAB	9713							Note 2
							ODA	9701									
							ONA	9702									
			GN2	9721	GN3	9720							SN5	9634			Note 3
			PCS-AN2	9562	PCS-AN3	9622							TN5	9635			
			PCS-HN2	9564	PCS-HN3	9624											
			PN2	9631	PN3	9641											
			QN2	9632	QN3	9642											
			RN2	9633	RN3	9643											
			XN2	9636	XN3	9646											
25 thru 85 (except 67) and 195	3031 thru 3195	1403 mdl 7	AN2	9612	AN3	9613					AN4	9621					Note 1
			HN2	9614	HN3	9615											
							OAA	9710	OAB	9713							Notes 2, 4
							ODA	9701									
							ONA	9702									
25 thru 85 and 195	3031 thru 3195	1416 (1403 mdl 3 or N1)	AN2	9612	AN3	9613					AN4	9621					Note 1
			HN2	9614	HN3	9615											
							ODA	9701									Note 2
							ONA	9702									
			GN2	9721	GN3	9720	OAA	9710	OAB	9713			SN5	9634	ALA6	9735	Notes 2, 5, 6
			PCS-AN2	9562	PCS-AN3	9622							TN5	9635			
			PCS-HN2	9564	PCS-HN3	9624											
			PN2	9631	PN3	9641											
			QNC2	9638	QNC3	9648											
			QN2	9632	QN3	9642											
			RN2	9633	RN3	9643											
			YN2	9637	YN3	9647											
25 thru 50 (except 44)	---	1404 mdl 2	AN2	9612	AN3	9613					AN4	9621					Note 7
			HN2	9614	HN3	9615											

IMPORTANT -- Prerequisites for attachment of a 1403 or 1404 Printer to a System/360 Processing Unit or 2821 Control Unit are described on the 1403 and 1404 "Machines" pages. The 1403 "Machines" page also covers prerequisites for attachment to System/370. Certain print chain/train arrangements require additional features (i.e., Universal Character Set or Multiple Character Set) on the printer and processing unit or control unit. These additional prerequisites are covered by "Notes" indicated under "Reference" in the above chart.

In any case below where the Universal Character Set Feature (#8640/8641) or Multiple Character Set Feature (#5110/5111) is shown as a prerequisite, either feature on the applicable 1403 will function with the MCS Adapter (#5100) on the 2025 Processing Unit.

Notes: (1) Arrangement AN4 can be used to prepare documents for optical reading by a 1428 Alphameric Optical Reader, 1282 Optical Reader Card Punch, or 1287 Optical Reader.

(2) OCR Arrangement OAA, ODA or ONA can be used to prepare documents for optical reading by a 1287, 1288 or 3886 optical reader. The OAB arrangement can also be used to prepare input for the 3886. For specific graphics which can be read, see reader Component Description manuals. Graphics which comprise each character set are illustrated on one of the following pages. If the Universal Character Set Feature, or Multiple Character Set Feature in System/360 model 25, is used on the 1403, it is recommended that the hook, fork and chair of the QNA Arrangement (#9702) or OAA Arrangement (#9710 modified by #9712) be coded as described under "OCR Fonts" on the previous page. Also, see "Printing for Optical Character Reading" on page TC 71.2.

(3) System/360 model 25 -- For natively attached 1403, Multiple Character Set Feature (#5110) and Interchangeable Chain Cartridge Adapter (#4740) are prerequisite on the 1403 and Multiple Character Set Adapter (#5100) is required on the 2025 Processing Unit. If 1403 is attached to 2025 via the Multiplexer Channel (#5248) or Selector Channel (#6960), 1403 must be equipped with Universal Character Set Feature (#8641) and Interchangeable Chain Cartridge Adapter (#4740), and 2821 Control Unit model 1, 2, 3 or 5 must be equipped with Universal Character Set Adapter (#8637, 8638 or 8639).

S/360 mdl 22, 30 thru 85 and 195 and any S/370 Processor -- Universal Character Set Feature (#8641) and Interchangeable Chain Cartridge Adapter (#4740) are prerequisite on the 1403 and Universal Character Set Adapter (#8637, 8638 or 8639) is required on 2821 Control Unit mdl 1, 2, 3 or 5.

(4) 1403 model 7 is not available for use with System/360 model 67.

(5) 1403 model 3 is not available for use with System/360 model 22, 85 or 195, nor for System/370 model 195.

(6) System/360 model 25 -- For natively attached 1403, Multiple Character Set Feature (#5111) is prerequisite on the 1403 and Multiple Character Set Adapter (#5100) is required on the 2025 Processing Unit. If 1403 is attached to 2025 via the Multiplexer Channel (#5248) or Selector Channel (#6960). 1403 must be equipped with Universal Character Set Feature (#8640) and 2821 Control Unit model 1, 2, 3 or 5 must be equipped with Universal Character Set Adapter (#8637, 8638 or 8639).

S/360 mdl 22, 30 thru 85 and 195 and any S/370 Processor -- Universal Character Set Feature (#8640) is required on the 1403 and Universal Character Set Adapter (#8637, 8638 or 8639) on the 2821 Control Unit mdl 1, 2, 3 or 5.

(7) A 2821 Control Unit model 4 is prerequisite. Arrangement AN4 can be used to prepare documents for optical reading by a 1282 Optical Reader Card Punch.
Note: The 1404 is not available for use with System/360 model 44 nor with System/370.

In addition to the arrangements listed above for System/360, any standard chain/train previously used with a 1400 series system (including numeric chains... see "Limitations" on next page) can be used on a 1403 equipped with the Universal Character Set Feature (or Multiple Character Set Feature in System/360 model 25). See page TC 71.5.

Specify: See next page.

SYSTEM/360, SYSTEM/370 and 4300 PROCESSORS -- 1403 and 1404 PRINTERS (cont'd)

•Specify: [1] For 1403 model 2 or 7, or 1404 model 2 -- One print chain Feature # unless Interchangeable Chain Cartridge Adapter (#4740) is ordered ... with #4740, specify two Feature #s.

For 1416 (1403 model 3 or N1) -- one print train Feature # for each 1416 ordered.

[2] If desired, #9140 for enlarged dash (Character No. 732464) in lieu of standard dash for printing on documents to be read by IBM optical mark readers. Available as substitution in all arrangements except OAA, OAB, AN-4, PCS-AN, PCS-HN, QNC, SN, TN, ALA, XN and YN.

[3] If desired, #9549 for slashed zero in lieu of standard zero in any arrangement excpet AN-4, OAA, OAB, ODA, ONA, SN5 and TN5.

[4] If desired, #9676 for round alphabetic "O" in lieu of standard squared "O" in any arrangement except AN-4, OAA, OAB, ODA, ONA, SN5 and TN5.

[5] If desired, #9722 for ! (exclamation point) in lieu of | (logical (OR) in GN arrangement.

[6] If desired, #9723 for ^ (circumflex) in lieu of ¬ (logical NOT) in GN arrangement.

[7] If desired, #9728 for - (timing mark dash) in lieu of * in OAA arrangement for printing timing marks on documents for the 3886 Optical Character Reader. For field installation, order character number 2642392 in Train Slug No. 2642393 or Chain Slug No. 2633870.

[8] If desired, #9729 for - (timing mark dash) in lieu of > in OAB arrangement for printing timing marks on documents for the 3886 Optical Character Reader. For field installation, order character number 1798438 in Train Slug No. 1798437 or Chain Slug No. 2645792.

[9] If desired, #9670 - so that the comma will appear five times and the pound sign only once in a QNC arrangement. Thus when printing commas on a line, the printer will maintain an output rate of 1110 lines per minute regardless of the frequency per line. There will be no throughput improvement when no commas are printed on a line. For field installation, order four type slug substitutions.

[10] If desired, #9690 for Non Standard Type Arrangement. See "Type Slug Substitutions" paragraph below.

Limitations: On a 1403 model 2 equipped with Universal Character Set Feature (#8641) or Multiple Character Set Feature (#5110), and using a numeric chain (#9484 or #9485), maximum speed is limited to 750 lines per minute. If machine is equipped with Numerical Print Feature (#5381) and is to be retained for use in System/360 or System/370, contact Special Product Marketing.

Alphabetic and numeric characters from Arrangement SN5 and TN5 cannot be substituted in any other arrangements, nor can characters from other arrangements be substituted in SN5 and TN5.

Because of lesser type face density of the SN5 and TN5 arrangements: (1) Ribbon life may be reduced when printing on continuous forms; (2) The number of normal print quality copies is limited to the original and first copy with the customer using additional copies at his own discretion.

The TN arrangement is limited to use at 6 lines per inch spacing due to the overlap otherwise created by exponent characters.

The ALA arrangement, available only for the 1416 Interchangeable Train Cartridge, has the following limitations: (1) Ribbon life may be reduced when printing on continuous forms because of greater type face density; (2) For optimum print quality, single part paper is recommended; (3) 6 lines per inch vertical spacing is recommended when under or over-printing (diacritical marks, etc.); (4) All special applications such as spirit, photo-offset, multilith, diazo, heat transfer or similar process should be tested to assure satisfactory results.

Notes: Arrangements AN2 and RN2 can be used to prepare documents to be read by a 1418 Optical Character Reader. See "Printing for Optical Character Reading" (page TC 71.2).

All standard 1403 chains/trains contain some ASCII characters. The GN arrangement provides a 63-character set consistent with the American Standard Code for Information Interchange (ANSI X3.4-1968).

It is important to select the arrangement which gives the highest print speed for the customer's applications. As a guide, the arrangement with the smallest character set should be selected. For example, the AN and HN 48-character sets have a nominal printing speed of 1100 lines per minute on the 1403 model N1, while the PN 60-character set runs at 955 lines per minute (nominal speed).

Feature #9690 (Non-standard Type Arrangement) will be specified for; (1) Rearrangement of standard type slugs; (2) Rearrangement of standard characters in one or more slugs; (3) Substitution of other available characters in slugs; (4) New design characters. #9690 should not be specified for the other substitutions allowed in the "Specify" list.

Arrangement RN is designed for FORTRAN/COBOL use. Any HN, PCS-HN, PN, QNC, QN and TN arrangement also has this capability.

Type Slug Substitutions: Standard type slugs can be substituted for others in announced arrangements without charge. These slugs are furnished at no charge when properly ordered and plant installed on a chain, or in a train. See "Substitute Characters" on page TC 110. For field installation, see "Substitute Characters - Field Installation" on page TC 110 for ordering. Also review "Limitations" above. The frequency of occurrence on the chain/train determines the quantity of identical slugs which must be ordered. See 1403 SRL (GA24-3073) for details of designing a custom chain or train.

Print Chains: Additional, spare, or replacement chains are available for either fixed or interchangeable cartridges used on the 1403 model 2 or 7, or 1404 model 2.

	Feature #
Any one chain arrangement listed on the previous page, chain only	5532

•Specify: #5532 and Feature # of desired chain. (Note: If both chains supplied with Interchangeable Chain Cartridge Adapter (#4740) are to be changed in the field, price applies to each chain. If more than two interchangeable cartridges are desired for a machine, or interchangeability with more than one machine is desired, consult

Print Trains: Additional print trains (which are 1416s) are available by ordering additional 1416 Interchangeable Train Cartridges ... see 1416 in "Machines."

SYSTEM/360, SYSTEM/370 and 4300 PROCESSORS -- 1403 and 1404 PRINTERS (cont'd)

Use of 1400 Series Chains/Trains: THIS CHART IS INCLUDED FOR INFORMATION PURPOSES ONLY. FOR A CUSTOMER WHO WILL BE CONVERTING TO SYSTEM/360 FROM AN INSTALLED 1400 SERIES SYSTEM, AND DESIRES TO RETAIN HIS 1403/1404 PRINTER FOR USE IN SYSTEM/360, THE 1400 SERIES PRINTING ARRANGEMENT CAN STILL BE USED. (PREREQUISITES FOR SYSTEM/360 USE ARE INCLUDED IN THE CHART.) WHENEVER REQUESTED BY THE CUSTOMER, THE 1400 SERIES CHAINS/TRAINS WILL BE CONVERTED TO SYSTEM/360 ARRANGEMENTS AT NO CHARGE IN ACCORDANCE WITH THE PROCEDURES UNDER "SPECIFY" ON THE 1403/1404/1416 "MACHINES" PAGES.

Prerequisites for attachment of a 1403 or 1404 Printer to a System/360 Processing Unit or 2821 Control Unit are described on the 1403 and 1404 "Machines" pages. Certain print chain/train arrangements require additional features (i.e., Universal Character Set or Multiple Character Set) on the printer and processing unit or control unit. These additional prerequisites are covered in the chart below.

	Std. Type Style		Alt. Type Style		1428 Type Style		Prerequisites for System/360 Use
	.095"	Feature #	.079"	Feature #	OCR	Feature #	
1400 Series Chain Arrangements -- 1403 model 2 (also see 1404 model 2, below)	A2	9601	A3	9581	A4	9591	System/360 model 25 -- Printer can be either natively attached to 2025 Processing Unit or via the Multiplexer Channel or Selector Channel. For printer natively attached: Either (a) or (b) is required: (a) 1403 with fixed cartridge or Interchangeable Chain Cartridge Adapter (#4740) and 2025 Processing Unit equipped with 1400 Series Compatibility (#4440) and 1401/1460 Compatibility (#4441). This permits use of any arrangement A thru K. (b) 1403 with Interchangeable Chain Cartridge Adapter (#4740) and Multiple Character Set Feature (#5110) plus Multiple Character Set Adapter (#5100) on 2025 Processing Unit. Any arrangement A thru K and numeric chains (#9484 and #9485) can be used. With numeric chains, printing speed is limited to 750 lines per minute ... see "Note" included in (d), below. For printer attached via Multiplexer Channel (#5248) or Selector Channel (#6960) on 2025: Either (c) or (d) is required: (c) 1403 with fixed cartridge or Interchangeable Chain Cartridge Adapter (#4740) and 2025 equipped with 1400 Series Compatibility (#4440) and 1401/1460 Compatibility (#4441), plus 2821 model 1, 2, 3 or 5. This permits use of any arrangement A thru K. (d) 1403 with Interchangeable Chain Cartridge Adapter (#4740) and Universal Character Set Feature (#8641) plus Universal Character Set Adapter (#8637, #8638 or #8639) on 2821 Control Unit model 1, 2, 3 or 5. This permits use of any arrangement A thru K plus numeric chains (#9484 and #9485). With numeric chains, printing speed is limited to 750 lines per minute. Note: If 1403 model 2 with Numeric Print Feature (#5381), from a 1400 Series System, is to be retained for use in System/360, consult Regional Special Product Marketing.
	B2	9602	B3	9582			
	C2	9603	C3	9583			
	D2	9604	D3	9584			
	E2	9605	E3	9585			
	F2	9606	F3	9586			
	G2	9607	G3	9587			
	H2	9608	H3	9588			
	J2	9609	J3	9589	J4	9599	
	K2	9610	K3	9590			System/360 model 30 -- Either (e) or (f) is required: (e) 1403 with fixed cartridge or Interchangeable Chain Cartridge Adapter (#4740) and 1401/1440/1460 Basic Compatibility (#4456) on 2030 Processing Unit. This permits use of any arrangement A thru K. (f) Same as (d) listed above for System/360 model 25. System/360 model 40 -- Either (g) or (h) is required: (g) 1403 with fixed cartridge or Interchangeable Chain Cartridge Adapter (#4740) and 1401/1460 Compatibility (#4457) on 2040 Processing Unit. This permits use of any arrangement A thru K. (h) Same as (d) listed above for System/360 model 25. System/360 models 44 thru 85 and model 195 -- Same as (d) listed above for System/360 model 25.
1400 Series Train Arrangements -- 1416 (1403 mdl 3)	A2	9611	A3	9616	A4	9591	System/360 model 25 -- 1403 model 3 cannot be used; however, 1416 Interchangeable Train Cartridge may be retained for use on a 1403 model N1. Printer can be either natively attached to 2025 Processing Unit or via the Multiplexer Channel or Selector Channel. For printer natively attached: Either (i) or (j) is required: (i) 1400 Series Compatibility (#4440) and 1401/1460 Compatibility (#4441) on 2025 Processing Unit permit use of A2, H2, A3, H3, A4 or J4 only. (j) Multiple Character Set Feature (#5111) on 1403 and Multiple Character Set Adapter (#5100) on 2025 Processing Unit permit use of all print train arrangements listed in (i) above plus the PCS arrangements. For printer attached via Multiplexer Channel (#5248) or Selector Channel (#6960) on 2025: Either (k) or (l) is required: (k) Same as (i) listed above. (l) Universal Character Set Feature (#8640) on 1403 and Universal Character Set Adapter (#8637, #8638, or #8639) on 2821 Control Unit model 1, 2, 3 or 5 permit use of all print train arrangements listed in (i) above plus the PCS arrangements. System/360 model 30 -- 1416 Interchangeable Train Cartridge installed on 1403 model 3 or N1 and 2821 Control Unit model 1, 2, 3 or 5, plus (m) or (n) are required: (m) 1401/1440/1460 Basic Compatibility (#4456) on 2030 Processing Unit permits use of A2, H2, A3, H3, A4 or J4 only. (n) Universal Character Set Feature (#8640) on 1403 and Universal Character Set Adapter (#8637, #8638, or #8639) on 2821 permit use of all print train arrangements in (m) above plus the PCS arrangements. System/360 model 40 -- 1416 Interchangeable Train Cartridge installed on 1403 model 3 or N1 and 2821 Control Unit model 1, 2, 3 or 5, plus (o) or (p) are required: (o) 1401/1460 Compatibility (#4457) on 2040 Processing Unit permits use of A2, H2, A3, H3, A4 or J4 only. (p) Same as (n) listed above for System/360 model 30. System/360 models 44 thru 75 -- 1416 Interchangeable Train Cartridge and Universal Character Set Feature (#8640) on 1403 model 3 or N1, plus Universal Character Set Adapter (#8637, #8638 or #8639) on 2821 Control Unit model 1, 2, 3 or 5. All A, H, J and PCS arrangements can be used.
	H2	9618	H3	9617			
					J4	9599	
	PCS-A2	9561	PCS-A3	9623			
	PCS-H2	9563	PCS-H3	9625			
1404 model 2 Printer							System/360 model 30 -- 2821 Control Unit model 4 plus (e) as listed above for 1403 model 2 in System/360 model 30. Compatibility is achievable only on the continuous form side of the 1404.

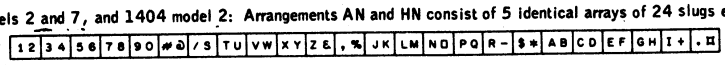
SYSTEM/360, SYSTEM/370 and 4300 PROCESSORS -- 1403 and 1404 PRINTERS (cont'd)

Print Chains: 1403 models 2 and 7, and 1404 model 2: Print chains consist of multiple arrays of type slugs placed end to end, with 2 characters per slug. The number of slugs in an array, and the number of different characters (graphics) in that array, will vary depending upon the print arrangement selected. Each print chain has a total of 120 slugs (240 character-positions).

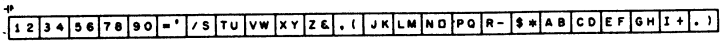
Standard Chains: In the illustrations below, the characters are depicted as printed out. Where multiple arrays are shown, only the differences from the previous array are indicated.

For 1403 models 2 and 7, and 1404 model 2: Arrangements AN and HN consist of 5 identical arrays of 24 slugs each. Only the first array is illustrated for each.

AN - 1st Array



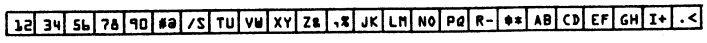
HN - 1st Array



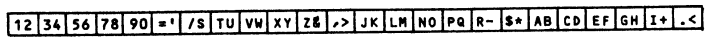
OCR Chains: For 1403 models 2 and 7: Arrangements OAA, OAB, ODA and ONA consist of 5 identical arrays of 24 slugs each. Only the first array is illustrated for each.

Note: See "Printing for Optical Character Reading" and "OCR Fonts" on page TC 71.2. When a 1403 model 2 with Universal Character Set Feature (#8641) or Multiple Character Set Feature (#5110) is used with the ONA arrangement, or OAA arrangement with ¢¥Ñ graphics, it is recommended that the ¢¥Ñ be coded as described under "OCR Fonts" on page TC 71.2. The Universal Character Set or Multiple Character Set is a prerequisite for the OAB arrangement on the 1403.

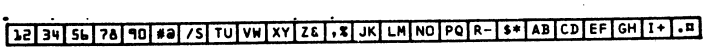
OAA - 1st Array



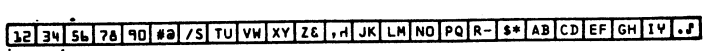
OAB - 1st Array



ODA - 1st Array



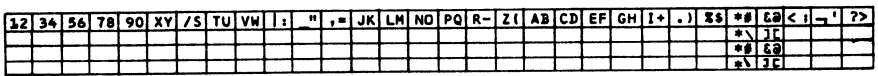
ONA - 1st Array



Universal Character Set Chains: For 1403 model 2 only: Universal Character Set Chain arrangements vary as follows:

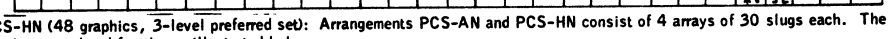
GN (ASCII - 63 graphics): Consists of 4 arrays of 30 slugs each. The first and third arrays are identical, as are the second and fourth, as illustrated below.

GN - 1st Array

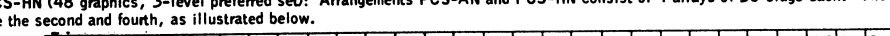


2nd Array

3rd Array

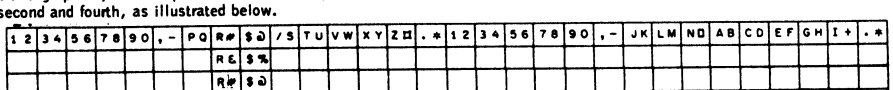


4th Array



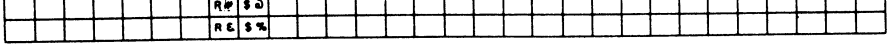
PCS-AN and PCS-HN (48 graphics, 3-level preferred set): Arrangements PCS-AN and PCS-HN consist of 4 arrays of 30 slugs each. The first and third arrays are identical, as are the second and fourth, as illustrated below.

PCS-AN - 1st Array

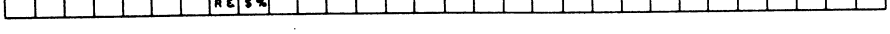


2nd Array

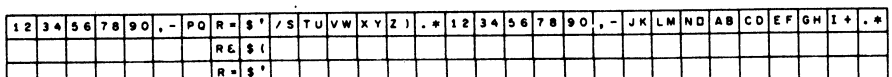
3rd Array



4th Array

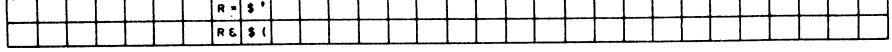


PCS-HN - 1st Array



2nd Array

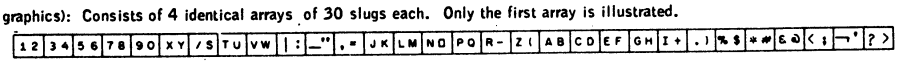
3rd Array



4th Array

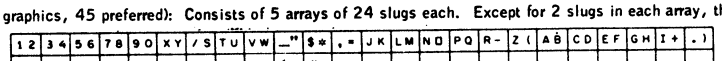
PN (PL/1 - 60 graphics): Consists of 4 identical arrays of 30 slugs each. Only the first array is illustrated.

PN - 1st Array

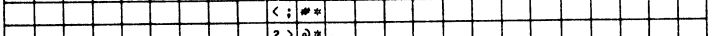


QN (PL/I - 60 graphics, 45 preferred): Consists of 5 arrays of 24 slugs each. Except for 2 slugs in each array, the 5 arrays are identical.

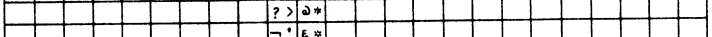
QN - 1st Array



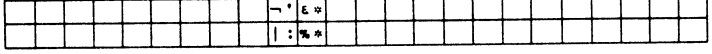
2nd Array



3rd Array



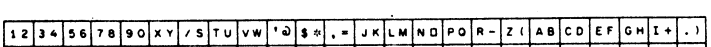
4th Array



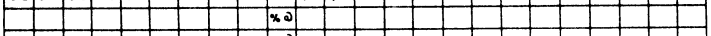
5th Array

RN (FORTRAN/COBOL/Commercial - 52 graphics, 47 preferred): Consists of 5 arrays of 24 slugs each. Except for one slug in each array, the 5 arrays are identical.

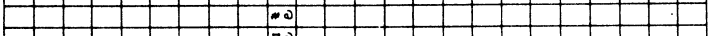
RN - 1st Array



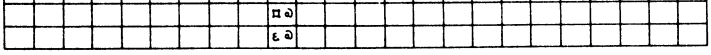
2nd Array



3rd Array

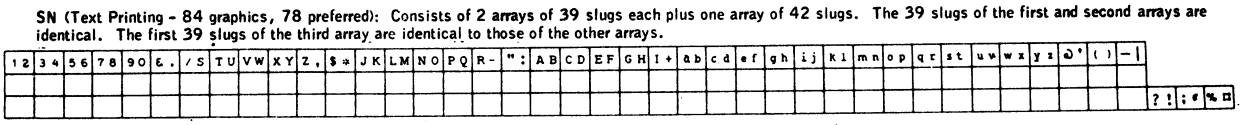


4th Array



5th Array

SN (Text Printing - 84 graphics, 78 preferred): Consists of 2 arrays of 39 slugs each plus one array of 42 slugs. The 39 slugs of the first and second arrays are identical. The first 39 slugs of the third array are identical to those of the other arrays.



SYSTEM/360, SYSTEM/370 and 4300 PROCESSORS -- 1403 and 1404 PRINTERS (cont'd)

Universal Character Set Chains (cont'd): TN (Text Printing - 120 graphics): Consists of 4 arrays of 30 slugs each. The first and third arrays are identical, as are the second and fourth, as illustrated.

TN - 1st Array	12	34	56	78	90	=.	/S	TU	VW	XY	Z,	#&	JK	LM	NO	PQ	R-	":	AB	CD	EF	GH	I+	ab	cd	ef	gh	ij	kl	mn
2nd Array	op	qr	st	uv	wx	yz	@'	?;	±!	$*	%¤	^{12}	^{34}	^{56}	^{78}	^{90}	$^{-+}$	$^{()}$	°¬	()	≠+	><	≤≥	¢•	[]	}{	└┘	┌┐	•_	-|
3rd Array	12	34	56	78	90	=.	/S	TU	VW	XY	Z,	#&	JK	LM	NO	PQ	R-	":	AB	CD	EF	GH	I+	ab	cd	ef	gh	ij	kl	mn
4th Array	op	qr	st	uv	wx	yz	@'	?;	±!	$*	%¤	^{12}	^{34}	^{56}	^{78}	^{90}	$^{-+}$	$^{()}$	°¬	()	≠+	><	≤≥	¢•	[]	}{	└┘	┌┐	•_	-|

XN (High Speed Alphameric - 40 graphics): Consists of 6 identical arrays of 20 slugs each. Only the first array is illustrated.

XN - 1st Array	12	34	56	78	90	..	AB	CD	EF	GH	IZ	JK	LM	NO	PQ	R*	$S	TU	VW	XY

Multiple Character Set: For use of UCS Chains on a 1403 model 2 with MCS Feature, see "Multiple Character Set" on page TC 71.2.

Print Trains: 1416 (1403 models 3 and N1): Print trains consist of multiple arrays of type slugs placed end to end, with 3 characters per slug. The number of slugs in an array, and the number of different characters (graphics) in that array, will vary depending upon the print arrangement selected. Each print train has a total of 80 slugs (240 character-positions).

In the train layouts illustrated below, the characters are depicted as printed out. Where multiple arrays are shown, only the differences from the previous array are indicated.

Standard Trains: Arrangements AN and HN consist of 5 identical arrays of 16 slugs each. Only the first array is illustrated for each arrangement.

AN - 1st Array	123	456	789	0#@	/ST	UVW	XYZ	&.%	JKL	MNO	PQR	-$*	ABC	DEF	GHI	+.¤
HN - 1st Array	123	456	789	0='	/ST	UVW	XYZ	&.(	JKL	MNO	PQR	-$*	ABC	DEF	GHI	+.)

OCR Trains: For 1416 (1403 model 3 or N1): Arrangements OAA, OAB, ODA and ONA consist of 5 identical arrays of 16 slugs each. Only the first array is illustrated for each.

Note: See "Printing for Optical Character Reading" and "OCR Fonts" on page TC 71.2. When the Universal Character Set Feature or Multiple Character Set Feature is used with the ONA arrangement, or OAA arrangement with ʃYH graphics, it is recommended that the ʃYH graphics be coded as described under "OCR Fonts" on page TC 71.2. The UCS or MCS Feature is a prerequisite for the OAA or OAB arrangement on the 1416.

OAA - 1st Array	L1-	M.0	/2Y	R9*	0%G	F3J	S8#	B<@	C6V	P7Z	D+8	K5*	E4X	NAW	IO,	HTU
OAB - 1st Array	L1Y	NDK	I2/	R9G	T>H	F3V	S8&	<OU	C6*	AWZ	.+Q	E5X	P4J	'$=	,0-	MB7
ODA - 1st Array	123	456	789	0#@	/ST	UVW	XYZ	&,%	JKL	MNO	PQR	-$*	ABC	DEF	GHI	+.¤
ONA - 1st Array	123	456	789	0#@	/ST	UVW	XYZ	&,H	JKL	MNO	PQR	-$*	ABC	DEF	GHI	Y.ʃ

Universal Character Set Trains: Universal Character Set arrangements vary as follows:

ALA (Library Printing - 162 graphics, 78 preferred): Consists of 4 arrays of 20 slugs each. The first and third arrays are identical, as are the second and fourth, except for the characters shown.

ALA - 1st Array	123	ABC	DEF	GHI	JKL	MNO	PQR	/ST	UVW	XYZ	ÆŒÞ	[]!	-":	.,'	456	789	0\‡	.?´	´-˘	~̮˙
2nd Array	abc	def	ghi	jkl	mno	pqr	?ßt	uvw	xyz	æœþ	αβγ	%±£	)(;	123	456	789	0-+	̦)(	·¨·	̆_=
3rd Array											ÐØŁ	[]#						`^ˇ	´¨-	--ı
4th Array							=ßt			đøı	ơƀ£	*ÐŠ		123	456	789	0-+	')(	><+	••~

GN (ASCII - 63 graphics): Consists of 4 arrays of 20 slugs each. The first and third arrays are identical, as are the second and fourth, as illustrated below.

GN - 1st Array	123	456	789	0XY	/ST	UVW	|:_	",=	JKL	MNO	PQR	-Z(	ABC	DEF	GHI	+.)	%$*	#&@	<;¬	'?>
2nd Array																		\][		
3rd Array																		#&@		
4th Array																		\][		

PCS-AN and PCS-HN (48 graphics, 3-level preferred set): Arrangements PCS-AN and PCS-HN consist of 4 arrays of 20 slugs each. The first and third arrays are identical, as are the second and fourth, as illustrated below.

PCS-AN - 1st Array	123	456	789	0,-	PQR	#$@	/ST	UVW	XYZ	¤.*	123	456	789	0,-	JKL	MNO	ABC	DEF	GHI	+.*
2nd Array						&$%														
3rd Array						#$@														
4th Array						&$%														

PCS-HN - 1st Array	123	456	789	0,-	PQR	=$'	/ST	UVW	XYZ	).*	123	456	789	0,-	JKL	MNO	ABC	DEF	GHI	+.*
2nd Array						&$(														
3rd Array						=$'														
4th Array						&$(														

PN (PL/I - 60 graphics): Consists of 4 identical arrays of 20 slugs each. Only the first array is illustrated.

PN - 1st Array	123	456	789	0XY	/ST	UVW	|:_	",=	JKL	MNO	PQR	-Z(	ABC	DEF	GHI	+.)	%$*	#&@	<;¬	'?>

SYSTEM/360, SYSTEM/370 and 4300 PROCESSORS -- 1403 and 1404 PRINTERS (cont'd)

Universal Character Set Trains (cont'd)

QNC (PL/I - 60 graphics, 45 commercially preferred): Consists of 5 arrays of 16 slugs each. Except for one slug in each array, the 5 arrays are identical.

QNC - 1st Array	123	456	789	0#@	/ST	UVW	XYZ	&.%	JKL	MNO	PQR	-$*	ABC	DEF	GHI	",=
2nd Array																|:_
3rd Array																<;¬
4th Array																'?>
5th Array																)+(

QN (PL/I - 60 graphics, 45 scientifically preferred): Consists of 5 arrays of 16 slugs each. Except for one slug in each array, the 5 arrays are identical.

QN - 1st Array	123	456	789	0XY	/ST	UVW	_"$	*,=	JKL	MNO	PQR	-Z(	ABC	DEF	GHI	+.)
2nd Array							<;#									
3rd Array							?>@									
4th Array							¬'&									
5th Array							|:%									

RN (FORTRAN/COBOL/Commercial - 52 graphics, 47 preferred): Consists of 5 arrays of 16 slugs each. Except for one slug in each array, the 5 arrays are identical.

RN - 1st Array	123	456	789	0XY	/ST	UVW	'@$	*,=	JKL	MNO	PQR	-Z(	ABC	DEF	GHI	+.)
2nd Array							%@$									
3rd Array							#@$									
4th Array							¤@$									
5th Array							&@$									

SN (Text Printing - 84 graphics, 78 preferred): Consists of 2 arrays of 26 slugs each plus 1 array of 28 slugs. The 26 slugs of the first and second arrays are identical. The first 26 slugs of the third array are identical to those of the other arrays.

SN - 1st Array	123	456	789	0&.	/ST	UVW	XYZ	.$*	JKL	MNO	PQR	-":	ABC	DEF	GHI	+ab	cde	fgh	ijk	lmn	opq	rst	uvw	xyz	@'(	)–|		
2nd Array																												
3rd Array																											?!;	¢%¤

TN (Text Printing - 120 graphics): Consists of 4 arrays of 20 slugs each. The first and third arrays are identical, as are the second and fourth, as illustrated.

TN - 1st Array	123	456	789	0=.	/ST	UVW	XYZ	,#&	JKL	MNO	PQR	-":	ABC	DEF	GHI	+ab	cde	fgh	ijk	lmn
2nd Array	opq	rst	uvw	xyz	@'?	;±!	$*%	¤^{12}	^{345}	^{678}	$^{90-}$	$^{+()}$	°¬(	)≠+	>< ≤	≥¢●	[]}	{└┘	┌¬●	_–|
3rd Array	123	456	789	0=.	/ST	UVW	XYZ	,#&	JKL	MNO	PQR	-":	ABC	DEF	GHI	+ab	cde	fgh	ijk	lmn
4th Array	opq	rst	uvw	xyz	@'?	;±!	$*%	¤^{12}	^{345}	^{678}	$^{90-}$	$^{+()}$	°¬(	)≠+	>< ≤	≥¢●	[]}	{└┘	┌¬●	_–|

YN (High Speed Alphameric - 42 graphics, 39 preferred): Consists of 4 arrays of 13 slugs each plus 2 arrays of 14 slugs each. The 13 slugs of the first, third, fourth and sixth arrays are identical. Except for the additional slug in the last position of the second and fifth arrays, the first 13 slugs are identical to those of the other arrays.

YN - 1st Array	123	456	789	0ST	ABC	DEF	GHI	JKL	MNO	PQR	UVW	XYZ	*,.	
2nd Array														#-$
3rd Array														
4th Array														
5th Array														#-$
6th Array														

Multiple Character Set: For use of UCS trains on a 1403 model N1 with MCS Feature, see "Multiple Character Set" on page TC 71.2.

SYSTEM/360, SYSTEM/370 and 4300 PROCESSORS -- 1443 MODEL N1 PRINTER

The 52-character set is standard on the 1443 model N1. On an initial machine order, the 63-character set may be specified at no charge in lieu of the 52-character set, if Selective Character Set (=6402) is ordered.

Special characters with their corresponding card codes and EBCDIC bit codes are shown for all character sets in the chart to the right. Graphics normally associated with the EBCD codes are those shown under the 63-character set.

Feature =s indicated below apply to plant installation only.

Character Set	1443 model N1
13	--
39	--
52	9088
63	9089

Specify: [1] For 1443 mdl N1 -- =9088 for 52-character set unless Selective Character Set (=6402) is ordered and the 63-character set is desired instead.

[2] Type Size -- =9731 for .079", or =9733 for .095".

[3] If desired, =9140 for enlarged dash (Character No. 830704) in lieu of standard dash. Used for printing on documents to be read by 1230, 1231, 1232 and 3881 optical mark readers. Available as substitution in either 52- or 63-character set.

[4] If desired, =9549 for slashed zero in lieu of standard zero in any character set.

[5] If desired, =9676 for round alphabetic "O" in lieu of standard squared "O" in 39-, 52- or 63-character set.

Additional Character Sets: Type bars are available with 13-, 39, 52- and 63-character sets as indicated below. All sets are alphameric except the 13-character set which is numeric only. Format of standard segments is illustrated and the quantity of identical segments in a 120 print position type bar is shown... for 144 print positions (circled items below), see Note (1).

Segment Number	Character Position Number												Character Sets 1443			
	1	2	3	4	5	6	7	8	9	10	11	12	13	13	39	52	63
51	.	*	-	0	1	2	3	4	5	6	7	8	9	(11)			
52	.	$	,	0	A	J	1	B	K	S	2	C	L		5		
53	&	-	0	A	J	/	1	B	K	S	2	C	L			4	3
54	T	3	D	M	U	4	E	N	V	5	F	0	W		(4)	(3)	3
55	6	G	P	X	7	H	Q	Y	8	I	R	Z	9		4	3	3
56	.	$	,	#	¤	*	%	@	(	)	=	'	+			4	
57	¢	!	■	:	.	$	,	#	<	*	%	@	(				(3)
58	)	_	'	+	;	>	=	|	¬	?	"	■	■				3

Note: 1) For a machine with 144 print positions, add one segment to any figure circled above for a 13-, 39-, 52- or 63-character set. For example, the 13-character set has eleven segments (all No. 51) for 120 print positions, but twelve such segments for 144 positions. The 39-character set has four No. 54 segments for 120 positions, but five for 144 positions. Similar determinations can be made for the other character sets.

2) Zero appears in Position 4 of Segment No. 51, Position 4 of Segment No. 52, and in Position 3 of Segment No. 53.

3) Alphabetic "O" is in Position 12 of Segment No. 54. It is squared slightly to distinguish it from numeric zero.

4) Position 3 of Segment No. 57 and Positions 12 and 13 of Segment No. 58 are blank. These positions cannot be used for character substitutions.

Character Set	Feature =
13	1901
39	1902
52	1903
63	1904

Specify: [1] Feature =(s) for additional character set(s) desired. [Note: Selective Character Set (=6402) is prerequisite on 1443 model N1 for all except the 52-character set.]

[2] =9495 for 120 print positions, or =9496 for 144 print positions [24 Additional Print Positions (=5558) is prerequisite for =9496] .

[3] Type Size, =9731 for .079" or =9733 for .095".

[4] If desired, =9140 for enlarged dash (Character No. 830704) in lieu of standard dash. Used for printing on documents to be read by 1230, 1231, 1232 or 3881 optical mark readers. Available only as substitution in 52- and 63-character sets.

[5] If desired, =9549 for slashed zero in lieu of standard zero in any character set.

[6] If desired, =9676 for round alphabetic "O" in lieu of standard squared "O" in 39-, 52- or 63-character set.

Substitute Characters: Any character illustrated elsewhere in this section for the 1403, 1404, 1443 or 1445, or any character previously designed for these machines, may be substituted in any character position of any segment subject to conditions applicable to character substitutions in the section "Other Than System/360 - 1443 Printer Models 1 and 2," starting on page TC 41, plus the conditions stated on page TC 51.

Feature =s for character substitutions and "Multiple Machine Orders" are the same as shown under "Substitute Characters" in the section starting on page TC 41.

Extd BCD Interchange Code		Character Sets			
Card Code	Bit Code 0123 4567	13	39	52	63
12-8-2	0100 1010				¢
12-8-3	1011	.	.	.	.
12-8-4	1100			¤	<
12-8-5	1101			(	(
12-8-6	1110			+	+
12-8-7	1111				|
12	0101 0000			&	&
11-8-2	1010				!
11-8-3	1011		$	$	$
11-8-4	1100	*		*	*
11-8-5	1101			)	)
11-8-6	1110				;
11-8-7	1111				¬
11	0110 0000	-		-	-
0-1	0001			/	/
0-8-3	1011		,	,	,
0-8-4	1100			%	%
0-8-5	1101				_
0-8-6	1110				>
0-8-7	1111				?
8-2	0111 1010				:
8-3	1011			#	#
8-4	1100			@	@
8-5	1101			'	'
8-6	1110			=	=
8-7	1111				"

(reverse is blank)

THIS PAGE LEFT INTENTIONALLY BLANK

SYSTEM/360 AND OTHER SYSTEMS -- 1445 PRINTER MODELS 1 and N1

A 56-character set which includes ABA characters is standard on the 1445 models 1 and N1. Type size is .095" high, except for the E-13B characters which conform to ABA Specifications. The chart to the right illustrates special characters furnished in the standard 56-character set plus those included in the optional 14- and 42-character sets.

Card and bit codes are shown for systems using the Standard BCD Interchange Code (BCD) and the Extended BCD Interchange Code (EBCD) of System/360. In addition to the graphics used on the 1445, the standard graphics assigned to the BCD and EBCD codes are shown for associative purposes. Where two graphics are shown under "Graphic Normally Associated with BCD Code," the one on the left is for Arrangement A, the other for H.

MICR Characters: Other than MICR numeric characters, the following are included in the 56-character set:

- Dash
- Amount
- Transit
- On Us

Graphic Normally Associated with BCD Code	1445 Model 1 1240/1401/1440/1460 Card Code	1445 Model 1 1240/1401/1440/1460 BCD Code	Graphics in 1445 Character Sets 14	42	56	1445 Model N1 System/360 Card Code	1445 Model N1 System/360 EBCD Code 01234567	Graphic Normally Associated with EBCD Code
.	12-8-3	B A 8 2 1	.	.	.	12-8-3	01001011	.
‡	0-8-2	A 8 2			¶	12-8-5	1101	(
'	8-4	C 8 4			⌊	12-8-6	1110	+
—	0-8-7	A 8 4 2 1			⌋	12-8-7	1111	|
$	11-8-3	C B 8 2 1	$	$	$	11-8-3	01011011	$
*	11-8-4	B 8 4	*	*	*	11-8-4	1100	*
?	12-0	C B A 8 2			?	11-8-5	1101	)
% (	0-8-4	A 8 4			0	11-8-6	1110	;
& +	12	C B A			¬	11-8-7	1111	¬
-	11	B	-	-	-	11	01100000	-
/	0-1	C A 1		/	/	0-1	0001	/
,	0-8-3	C A 8 2 1		,	,	0-8-3	1011	,
¥	0-8-5	C A 8 4 1			¥	0-8-4	1100	%
]	11-8-5	C B 8 4 1			‡	0-8-5	1101	_
* =	8-3	8 2 1			3	0-8-6	1110	>
¶	8-7	C 8 4 2 1			6	0-8-7	1111	?
:	8-5	8 4 1			5	8-4	01111100	'
[	12-8-5	B A 8 4 1			⌊	8-5	1101	-
!	11-0	B 8 2			8	8-6	1110	=
¤)	12-8-4	C B A 8 4			¬	8-7	1111	"

Specify: [1] #9570 for 56-character set to be used with 1240, 1401, 1440, 1460 or System/360... [2] #9733 for .095" type size (all except E-13B characters).

Character Sets: Type bars are available with 14-, 42- or 56-character sets. The 14-character set is numeric only (with 4 special characters)... the 42- and 56-character sets are alphameric (with 6 special characters). The 56-character set also includes fourteen E-13B symbols. The format of standard segments included in each character set is illustrated below. All characters below are a facsimile of 1445 printing and are slightly smaller than actual size. The quantity of identical segments in a 113 print-position type bar is shown.

Segment Number	Character Position Number 1	2	3	4	5	6	7	8	9	10	11	12	13	14	Quantity of identical segments in character set (113 print positions) 14 Character Set	42 Character Set	56 Character Set
1	1	2	3	4	5	6	7	8	9	0	.	$	*	-	9		
2	P	8	Y	H	Q	9	Z	I	R	0	,	.	$	*		3	3
3	-	1	/	A	J	2	S	B	K	3	T	C	L	4		4	3
4	U	D	M	5	V	E	N	6	W	F	0	7	X	G		4	3
5	5	⌊	:	'	¶	?	8	3	¬	O	¤	6	2	—			3

Notes

1) Zero appears in Position 10 of Segment No. 1 and in Position 10 of Segment No. 2.

2) Alphabetic "O" is in Position 11 of Segment No. 4. It is squared slightly to distinguish it from the numeric zero.

3) Segment No. 5 contains the E-13B characters. The zero is in Position 10.

Character Set	Feature #
14	1898
42	1899
56	1906

Specify: [1] Feature #(s) for additional character set(s) desired. Note: Selective Character Set (#6402 on model N1) is prerequisite for all except the 56-character set (see 1445 in "Machines").

[2] Type Size, #9733 for .095".

(Continued)

SYSTEM/360 AND OTHER SYSTEMS -- 1445 PRINTER MODELS 1 AND N1 (cont'd)

Substitute Characters: A substitute character is one which is ordered to displace a character in one of the standard segment formats illustrated on the previous page. Note: A substitute character assumes the card and bit codes of the character it replaces in the system to which the printer is attached.

Character substitutions may be ordered for plant or field installation in a character set, subject to the following:

Artwork (#9950): A Service Charge will be made for designing a new character. Any character illustrated elsewhere in this section for the 1403, 1404, 1443, or 1445, or any character previously designed for these machines (except for "Limitations" below), may be substituted in any segment format without charge for artwork.

Limitations: [1] The ABA E-13B type font can only be used on the 1445. The ⑈ and ? (E-13B symbols for the "Dash" and "7") cannot be relocated from their present positions in the standard MICR type segment. This restriction applies to any arrangement of standard MICR or non-MICR type segments, or combinations of both. These characters must always be located in Character Positions 14 and 6, respectively... see Segment No. 5 of the 56-character set under "Character Sets" on the previous page. [2] Characters from the SN5 and TN5 arrangements of the 1403 Printer in System/360 cannot be used on the 1445. [3] The use of .079" character substitutions is not recommended.

Matrix (#9951): Each character requires a matrix. A Service Charge will be made for the matrix unless an identical matrix exists at the plant. This charge is in addition to that for Artwork. Note: 1443 matrices cannot be used to fabricate 1445 segments, or vice versa.

Set-Up (#9952): In addition to charges for Artwork and Matrix (if applicable), a Service Charge applies each time a set-up is required to fabricate a segment format other than those illustrated. This Service Charge is the same regardless of the quantity of identical segments made at any one time. On re-orders of identical segments, the set-up charge again applies.

Segment (#6404): Each character set consists of multiples of one or more segments. The quantity of identical segments in a character set is indicated in the chart on the previous page. In addition to applicable Service Charges above, a charge applies for each non-standard segment required to complete a character set... it applies only when an installed type bar is to be modified.

Service Charges for Artwork, Matrix and Set-Up should be authorized on all orders for non-standard characters. The charge for Artwork need not be specified when character numbers from the illustrated catalog are ordered indicating that artwork is available. The plant will review all orders to determine if Artwork and Matrix are required. The Service Charges (even though authorized) will not be billed unless applicable.

Description	Feature #
Artwork, per character	9950
Matrix, per character	9951
Set-Up, for each different segment format	9952
Segment, each (field installation)	6404

Multiple Machine Orders (identical type specs - Plant installation): On a multiple machine order, the Service Charges for Artwork, Matrix and Set-up apply only to the first machine and are to be entered for that machine order only.

For additional machines with all specs identical (including type), enter quantity of machines and specify #9695 (Special Type - Multiple Machine Order) at no charge. Once Plant Order numbers are assigned, enter the following under "Remarks":

On first machine order, indicate that Service Charges for special type also cover all other Plant Order numbers:
Example: SVC CHGS FOR SPEC TYPE COVER
E12341 E12342 E12343 E12344
E12345

On each additional machine order, indicate Plant Order number (first machine) which carries Service Charges:
Example: SVC CHGS FOR SPEC TYPE ON
E12340

A separate Type Spec Sheet is required for each machine and must be sent to the plant with sufficient lead time for the manufacturing schedule.

The Type Spec Sheet for the first machine must include the Service Charges as entered on that machine order plus a transmittal (memo) listing the Plant Order numbers of all additional machines involved. The spec sheet for each additional machine must indicate the Plant Order number of the machine which carries the Service Charges. (This may be written in the money fields of the Spec Sheet as "Service Charges on P.O. (insert number)."

Note: This cross reference of Plant Order numbers is mandatory on machine orders and Type Spec Sheets.

If an additional machine with identical type specs is ordered prior to shipment of a machine which carries the Service Charges, specify #9695 on the order, and indicate under "Remarks" the Plant Order number which carries the Service Charges. Send a Type Spec Sheet to the plant indicating the Plant Order number which carries the Service Charges. (When the order is entered after shipment of the machine carrying the Service Charges, the Set-up Charge will apply.)

If a machine with #9695 specified at no charge is shipped before the machine specifying the Service Charges, the plant will transfer the charges to the machine which is shipped first and substitute "No Charge" on the other one.

Specify: [1] 1445 Type Specification Sheet (120-1056) must accompany each order for substitute characters. Once a Type Specification Sheet has been submitted and additional characters are desired, a new Type Specification Sheet is required. It must include all characters desired... those previously ordered and the new ones.

[2] Type Size, #9733 for .095" (all except E-13B characters).

(continued)

3780 DATA COMMUNICATIONS TERMINAL

Any one of the available character sets may be specified on the initial 3780 order.

Special characters with their corresponding card codes are shown for all character sets in the chart to the right.

Feature #s indicted below apply to plant installation only.

Character Set	Feature
39	#9087
52	9088
63 EBCDIC	9089
63 ASCII	9102

Note: If Transmission Code is ASCII (#9762), the ASCII caharacter set is required.

For prices of character sets other than the one furnished at no charge, see "Character Sets" below.

Specify: [1] Feature # for standard character set.

[2] If desired #9676 for round alphabetic "O" in lieu of standard squared "O", for any character set except ASCII (#9102).

[3] If desired, #9140 for enlarged dash (Character No. 830704) in lieu of standard dash for printing on documents to be read by 1230, 1231, 1232 optical mark readers. Available as a substitution in a 52- or 63-character set.

[4] If desired, #9549 for slashed zero in lieu of standard zero in any character set.

[5] Type size -- #9733 for .095", or #9731 for .079".

Character Sets: Type bars are available with 39-, 52- and 63-character sets as illustrated below. The format of standard segments is illustrated and the quantity of identical segments in the various character sets and number of print positions are shown.

Note: 1) For example, using the EBCDIC chart, the 39-character set has four No. 54 segments for 120 positions or five for 144 positions.

2) Zero appears in the following locations on the different type bars:
EBCDIC - Segment 52, Position 4 and Segment 53, Position 3.
ASCII - Segment 1, Position 1.

3) Alphabetic "O" appears in the following locations on the different type bars:
EBCDIC - Segment 54, Position 12.
ASCII - Segment 5, Position 10.

Additional Character Sets:

Code	Char Set	Feature
EBCDIC	39	#1902
EBCDIC	52	1903
EBCDIC	63	1904
ASCII	63	1897

Specify: [1] Feature #(s) for additional character set(s) desired.

[2] #9495 for 120 print positions, or #9496 for 144, if applicable. Prerequisite: For #9496, Print Positions, Add'l (#5701).

[3] If desired, #9240 for enlarged dash (Character No. 830704) in lieu of standard dash for printing of documents to be read by 1230, 1231 or 1232 optical mark readers. Available as a substitution in 52- and 63-character sets.

[4] If desired, #9649 for slashed zero in lieu of standard zero in any character set.

[5] If desired, #9776 for round alphabetic "O" in lieu of standard squared "O". Available in all character sets except #1897.

[6] Type Size -- #9833 for .095" or #9831 for .079".

Substitute Characters: Any character illustrated elsewhere in this section for the 1403, 1404, 1443, or 1445, or any character previously designed for these units, may be substituted in any character position except those shown as blanks subject to conditions applicable to character substitutions in the section starting on page TC 41 (1443 Printer, mdls 1 and 2) plus the conditions stated on page TC 51.

CARD CODE	EBCDIC 39	EBCDIC 52	EBCDIC 63	ASCII 63
12-8-2			¢	[
12-8-3	.	.	.	.
12-8-4		¤	<	<
12-8-5		(	(	(
12-8-6		+	+	+
12-8-7			¦	¦
12		&	&	&
11-8-2			!	]
11-8-3	$	$	$	$
11-8-4		*	*	*
11-8-5		)	)	)
11-8-6			;	;
11-8-7			¬	¬
11		-	-	-
0-1		/	/	/
0-8-2				\
0-8-3	,	,	,	,
0-8-4		%	%	%
0-8-5			_	_
0-8-6			>	>
0-8-7			?	?
8-2			:	:
8-3		#	#	#
8-4		@	@	@
8-5		'	'	'
8-6		=	=	=
8-7		"	"	"

Note: A maximum of 63 graphics are available in EBCDIC or ASCII code set. In EBCDIC, the printable graphics include "Space" code ... in ASCII, 63 graphics can be printed, plus "Space" code.

EBCDIC -- Standard Segment Layouts

Segment Number	Character Position Number 1	2	3	4	5	6	7	8	9	10	11	12	13	No. of Segments -- determined by number of print positions and character set. 39 120	39 144	52 120	52 144	63 120	63 144
52	.	$	,	0	A	J	1	B	K	S	2	C	L	5	5				
53	&	-	0	A	J	/	1	B	K	S	2	C	L			4	4	3	4
54	T	3	D	M	U	4	E	N	V	5	F	O	W	4	5	4	4	3	3
55	6	G	P	X	7	H	Q	Y	8	I	R	Z	9	4	4	3	4	3	3
56	.	$	,	#	¤	*	%	@	(	)	=	'	+			3	3		
57	¢	!	■	:	.	$	,	#	<	*	%	@	(					3	3
58	)	_	'	+	;	>	=	¦	¬	?	"	■						3	3

ASCII -- Standard Segment Layouts

Segment Number	Character Position Number 1	2	3	4	5	6	7	8	9	10	11	12	13	No. of Segments -- determined by number of print positions and character set. 63 120	63 144
1	0	@	P	!	1	A	Q	"	2	B	R	#	3	3	4
2	C	S	$	4	D	T	%	5	E	U	&	6	F	3	3
3	V	'	7	G	W	(	8	H	X	)	9	I	Y	3	3
4	*	:	J	Z	+	;	K	[	,	<	L	\	-	3	3
5	=	M	]	.	>	N	¬	/	?	O	_	■		3	3

[reverse side is blank]

THIS PAGE LEFT INTENTIONALLY BLANK

5203 PRINTER MODEL 3 -- SYSTEM/370 MODEL 115

Either an AN or HN (48-character set) is standard on the 5203 model 3. Other arrangements require Universal Character Set Attachment (#8639) on the 5203 and Universal Character Set Control (#9848) on the 3115 Processing Unit. A chart, similiar to the following, showing 80-column card codes and associated EBCDIC bit codes (for AN, HN, GN and PN of a 1403 Printer) is on page TC 71.1 ... it also applies to the 5203 model 3 in System/370 Model 115.

96-col. Card Code	EBCDIC Code	Arrangements and Number of Graphics			
		AN(48)	HN(48)	PN(60)	GN(63)
BA8 21	0100 1011	.	.	.	.
BA84	1100	¤		<	<
BA84 1	1101		(	(	(
BA842	1110	+	+	+	+
BA8421	1111			|	|
A8 2	0101 0000	&	&	&	&
B 8 21	1011	$	$	$	$
B 84	1100	*	*	*	*
B 84 1	1101		)	)	)
B 842	1110			;	;
B 8421	1111			¬	¬
B	0110 0000	-	-	-	-
A 1	0001	/	/	/	/
A8 21	1011	,	,	,	,
A84	1100	%		%	%
A84 1	1101			_	_
A842	1110			>	>
A8421	1111			?	?
8 21	0111 1011	#		#	#
84	1100	@		@	@
84 1	1101		'	'	'
8 2	1010			:	:
842	1110		=	=	=
8421	1111			"	"
See Note	1110 0000				\
B 8 2	0101 1010				]
BA8 2	0100 1010				[

Note: No 96-column card code is associated with this internal EBCDIC Code. See TC 71.1 - 71.8 for 80 column card codes, regarding these sets.

Printing Speeds: The table below illustrates printing speeds for available print arrangements. All speeds shown assume single line spacing (no skipping). For AN and HN arrangements, the printing speeds are based upon a 132 character print line and a random distribution of characters. To determine print speeds for the PN and GN arrangements (UCS Applications), a mathematical model was devised. Based upon assumptions concerning the number and frequency of characters in a line for a "typical" application, the model predicted the ranges in the table. These speed ranges are provided only as a guide to performance. Actual throughput rates depend upon character set, number and frequency of characters printed on each line and vertical spacing or skipping. If actual throughput rates are required, the job(s) should be benchmarked and timed.

Arrangement	Character Set	Printing Speeds
AN, HN	48 graphics	300 lpm
PN	60 graphics	197 to 213 lpm
GN	63 graphics	190 to 212 lpm

Type Arrangements: Print arrangements are assigned an alphabetic designation (AN, HN, PN, GN). The type size is denoted by a numeric suffix, with 2 = .095" type size and 3 = .079" type size. Based on this coding, feature #s are assigned as indicated below for each available arrangement.

Standard Type Style		Alternate Type Style	
.095"	Feature #	.079"	Feature #
AN2	9666	AN3	9776
HN2	9667	HN3	9777
PN2	9664	PN3	9665
GN2	9660	GN3	9661

Notes: (1) To avoid overlap when printing 8 lines/inch, specify .079" type size.
(2) Arrangements PN and GN require Universal Character Set Attachment (#8639) on the 5203.

Specify: For Plant Installation

[1] One feature # for print arrangement desired ... see "Type Arrangements" above.

[2] If desired, #9549 for slashed zero in lieu of standard zero in any arrangement.

[3] If desired, #9676 for round alphabetic "O" in lieu of standard squared "O" in any arrangement.

[4] If desired, #9722 for Exclamation Point (!) in lieu of Logical OR (|) in the GN arrangement.

[5] If desired, #9723 for Circumflex (^) in lieu of Logical NOT (¬) in the GN arrangement.

[6] If desired, #9140 for enlarged dash in lieu of standard dash for printing on documents to be read by IBM optical mark readers. Available as substitution in all arrangements.

[7] If desired, #9690 for Non Standard Type Arrangement. See "Type Slug Substitutions" paragraph on TC 110.

For Field Installation of Interchangeable Train Cartridge, Add'l (#4740)

[1] One feature # for print arrangement desired ... see "Type Arrangements" above.

[2] #9549, #9676, #9722, #9723 or #9140 may be specified on MES for substitution in the arrangement selected. For other character substitutions see "Specify" under "Plant Installation" of "Substitute Characters" below.

For modification of installed trains, see "Field Installation" under "Substitute Characters" on page TC 110.

Print Trains: The Interchangeable Train Cartridge consists of multiple arrays of type slugs placed end to end with 3 characters per slug. Each cartridge has a total of 80 slugs (240 character positions). In the layouts illustrated below, the characters are depicted as they appear on the cartridge.

Standard Arrangements: Arrangements AN and HN consist of 5 identical arrays of 16 slugs each. Only the first array is illustrated. 48 graphics.

AN - 1st Array	123	456	789	0#@	/ST	UVW	XYZ	&,%	JKL	MNO	PQR	-$*	ABC	DEF	GHI	+.¤
HN - 1st Array	123	456	789	0='	/ST	UVW	XYZ	&,(	JKL	MNO	PQR	-$*	ABC	DEF	GHI	+.)

Character position numbers are assigned as follows for the 5 arrays: 1st array: 1-48, 2nd array: 49-96, 3rd array: 97-144, 4th array: 145-192, 5th array: 193-240.

Universal Character Set: Arrangement PN consists of 4 identical arrays of 20 slugs each. Only the first array is illustrated. 60 graphics.

PN - 1st Array	123	456	789	0XY	/ST	UVW	|:_	",=	JKL	MNO	PQR	-Z(	ABC	DEF	GHI	+.)	%$*	#&@	<;¬	'?>

Character position numbers are assigned as follows for the 4 arrays: 1st array: 1-60, 2nd array: 61-120, 3rd array: 121-180, 4th array: 181-240.

Arrangement GN consists of 4 arrays of 20 slugs each. The first and third arrays are identical, as are the second and fourth. Only the first and second arrays are illustrated. 63 graphics.

GN - 1st Array	123	456	789	0XY	/ST	UVW	|:_	",=	JKL	MNO	PQR	-Z(	ABC	DEF	GHI	+.)	%$*	#&@	<;¬	'?>
- 2nd Array	123	456	789	0XY	/ST	UVW	|:_	",=	JKL	MNO	PQR	-Z(	ABC	DEF	GHI	+.)	%$*	\][	<;¬	'?>

Character position numbers are assigned as follows for the 4 arrays: 1st array: 1-60, 2nd array: 61-120, 3rd array: 121-180, 4th array: 181-240.

SUBSTITUTE CHARACTERS - FOR
1403 PRINTER MODELS 2, 7 - S/360, S/370
1416 INTERCHANGEABLE TRAIN CARTRIDGE
3203 PRINTER, ALL MODELS
5203 PRINTER MODEL 3 - S/370 MODEL 115

It may be a customer advantage to have a character set other than standard. Or it may be necessary to provide a customer designed character. This section outlines the order for these requirements. It is not feasible to make actual printing tests on non-standard characters. Therefore, printing and ribbon life from trains with non-standard characters may be less satisfactory than results from standard trains. It should also be noted that because of limitations of type face area (height, width, etc.), characters of the customer's design are subject to acceptance by the plant.

A substitute character is one which is ordered to displace a character in one of the standard arrangements. Standard characters may be rearranged, special characters may be selected from the type catalog, or characters of the customer's design may be substituted, subject to the above limitations.

Note: A substitute character assumes the card and bit codes of the character it replaces in the system to which the printer is attached, unless the card and bit codes are changed.

Character substitutions may be ordered for plant or field installation. Standard characters (pgs TC 52 - 58) will not require artwork, but may require matrix and set-up. Special design characters may require all three.

Artwork (≈9950): A Service Charge will be made for designing a new character. Any character illustrated on pages 52 to 58, or any character previously designed for the printers headed by this section (except for "Limitations" below) may be substituted in any position of any type slug without charge for artwork.

Limitations [1] The ABA E-13B type font cannot be used ... [2] Characters from the SN5 and TN5 arrangements cannot be substituted in other arrangements.

Matrix (≈9951 or ≈9953): A chain or train type slug consists of two or three characters and requires one matrix (≈9951 or ≈9953). A Service Charge will be made for the matrix unless identical matrices (same characters in same positions) exist at the plant. This charge is in addition to that for Artwork.

Set-Up (≈9952 or ≈9954): In addition to charges for Artwork and Matrix (if applicable), a Service Charge applies each time a set-up is required to fabricate a special type slug. This charge is the same regardless of the quantity of identical slugs made at any one time. On re-orders of identical slugs, the set-up charge again applies.

Service Charges for Artwork, Matrix and Set-Up should be authorized on all orders for non-standard characters. The charge for Artwork need not be specified when character numbers from the illustrated catalog are ordered, indicating that artwork is available. The plant will review all orders to determine if Artwork and Matrix are required. The Service Charges (even though authorized) will not be billed unless applicable.

	1403 - 2,7	1416, (3203), 5203 - 3
	Feature	Feature
Artwork, per character	≈9950	≈9950
Matrix, per slug	9951	9953
Set-Up for slug	9952	9954

• Plant Installation (original assembly of chain or train): Any standard type slug (size, font) can be specified in any desired arrangement at no extra charge. Instructions for rearrangement of standard characters and slugs, and definition and location of special design slugs is found on the Type Specification Sheet,

Multiple Machine Orders (identical type specs - plant installation): On a multiple machine order, the Service Charges for Artwork, Matrix and Set-up apply only to the first machine and are to be entered for that machine order only.

For additional machines with all specs identical (including type), enter quantity of machines and specify ≈9695 (Special Type - Multiple Machine Order) at no charge.

Once Plant Order numbers are assigned, enter the following under "Remarks":

On first machine order, indicate that Service Charges for special type also cover all other plant order numbers:

Example: SVC CHGS FOR SPEC TYPE COVER
E12341 E12342 E12343 12344
E12345

On each additional machine order, indicate plant order number (first machine) which carries Service Charges:

Example: SVC CHGS FOR SPEC TYPE ON
E12340

A separate Type Spec Sheet is required for each machine and must be sent to the Endicott Plant with sufficient lead time for the manufacturing schedule.

The spec sheet for the first machine must include the Service Charges as entered on that machine order plus a transmittal (memo) listing the Plant Order numbers of all additional machines involved. The spec sheet for each additional machine must indicate the Plant Order number of the machine which carries the Service Charges. (This may be written in the money fields of the Spec Sheet as "Service Charges on P.O. (insert number)."

Note: This cross reference of Plant Order numbers is mandatory on machine orders and Type Spec sheets.

If an additional machine with identical type specs is ordered prior to shipment of a machine which carries the Service Charges, specify ≈9695 on the order, and indicate under "Remarks" the Plant Order number which carries the Service Charges. Send a Type Specification Sheet to the Endicott Plant indicating the Plant Order No. of the machine which carries the Service Charges. (When the order is entered after shipment of the machine carrying the Service Charges, the Set-up charge will apply.)

If a machine with ≈9695 specified at no charge is shipped before the machine specifying the Service Charges, the plant will transfer the charges to the machine which is shipped first and substitute "No Charge" on the other one.

Specify: [1] Feature ≈ of print arrangement which most closely resembles that desired by the customer.

[2] ≈9690 (Non-standard Type Arrangement) must be specified for any of the following changes.
1) Rearrangement of standard type slugs.
2) Rearrangement of standard characters in one or more slugs.
3) Substitution of other available characters (pages TC 52 -58) in slugs.
4) New special characters.

[3] Feature ≈s and charges for Artwork, Matrix and Set-up if required. The Service Charges (even though authorized) will not be billed unless applicable.

[4] Type Specification Sheet must be submitted for each order for substitute characters. Once a type specification sheet has been submitted and additional characters are desired, a new type specification sheet is required. It must include all characters desired ... those previously ordered and the new ones.

• Field Installation: The prices apply to installation of standard type slugs (to which charges for Artwork, Matrix and Set-up are to be added if applicable).

Print chains or trains are made up of identical arrays of type slugs as described above. When a modification is made to a slug in one array, corresponding type slugs must be changed in all identical arrays.

Type Slug Substitutions (for a chain or train)

	Feature
First type slug (1403 - 2,7)	≈8371
Ea, add'l slug (at same time)	8372
First type slug (1416,5203)	8373
Ea, add'l slug (at same time)	8374

Specify: [1] Feature ≈ of installed chain or train which is to be modified.

[2] Applicable Feature ≈ and charges for Artwork, Matrix and Set-up.

[3] Feature ≈s and charges for type slug substitutions. Type slugs (≈8371 thru ≈8374) may be ordered on MES with Type Specification Sheet, attached for any of the following:

	Type Catalog Character Number	
	.095" Type Size	.079" Type Size
Round alphabetic "O" in lieu of standard squared "O"	251839	475504
Slashed zero in lieu of standard zero	474129	475539
Exclamation Point in lieu of Logical OR	749306	859820
Circumflex in lieu of Logical NOT	847243	847243

Note: For examples of charges for substitute characters, see examples on page TC 34 - 35.

VIRTUAL STORAGE SYSTEM/370s, 4331, 4341, 3031, 3032, 3033 PROCESSORS and 3777 -- 3203 PRINTER

Print Trains: The 1416 Interchangeable Train Cartridge is used on the 3203 Printer. It is the same as that used on the 1403 mdl 3 and N1. Additional print trains (1416's) are available by ordering additional 1416 Interchangeable Train Cartridges ... see 1416 in "Machines" section.

The Universal Character Set is standard on the 3203; therefore, no special feature is required for any available arrangement.

See SRL GA24-3073 for graphics and associated EBCDIC card and bit codes.

Print Train Arrangements: Trains are assigned alphabetic and numeric designations to indicate type size, style and arrangement. The type size or style is denoted by a numeric suffix (AN2, HN3, etc.) with 2 = .095" type size, 3 = .079" type size, 5 = Text Type Style, etc. Type sizes (the suffix) should not be intermixed. Based on this coding, print trains are assigned a Feature #, as indicated below, for each arrangement.

Std Type Style		Alt. Type Style		Text Type Style		Library Type Style		OCR Font (Size 1)			
.095"	SF #	.079"	SF #	Text Prtg	SF #	Lib Prtg	SF #	Style A	SF #	Style B	SF #
AN2	9612	AN3	9613	SN5	9634	ALA6	9735	OAA	9710	OAB	9713
HN2	9614	HN3	9615	TN5	9635			ODA	9701		
GN2	9721	GN3	9720					ONA	9702		
PCS-AN2	9562	PCS-AN3	9622								
PCS-HN2	9564	PCS-HN3	9624								
PN2	9631	PN3	9641								
QNC2	9638	QNC3	9648								
QN2	9632	QN3	9642								
RN2	9633	RN3	9643								
YN2	9637	YN3	9647								

Notes: 1) OCR fonts or arrangements can be used to prepare documents for IBM optical character readers. Marks may also be printed for reading by optical mark readers. For specific graphics which can be read, see the reader Component Description manuals. For graphics which comprise each character set, refer to page TC 71.1 etc. Also see "Printing for Optical Character Reading on page TC 71.2

2) The IBM OCR characters in arrangements OAA, ODA and ONA are derived from, but not identical to, the designs described in the USASCOCR standard of the American National Standards Institute. Consequently, it should not be represented that the IBM OCR A Font is the same as the standard OCR A Font.

3) The IBM OCR characters in arrangement OAB are representative of (but not always identical to) the characters described in the European Computer Manufacturers Association's Standard ECMA-11 for Alphanumeric Character Set OCR-B for Optical Character Recognition, 2nd Edition, October 1971. Consequently, it should not be represented that the IBM OCR B Font is the same as the standard ECMA B Font.

Nominal printing speeds for all available arrangements are shown. "Nominal" speed is a weighted average of mean expected value for printing applications which use single line spacing (no skipping). These printing speeds are provided only as a guide to performance. Actual throughput rates are a function of character set, number and frequency of characters printed on each line and vertical spacing or skipping. If actual throughput rates are required, the application(s) should be benchmarked and timed.

The nominal speed is dependent upon the frequency with which the various subsets in a preferred character set are printed. For example, the PCS-AN arrangement consists of 48 different graphics arranged in a sequence so that some of the characters occur more frequently than others.

48 graphics -- 3-level preferred set	PCS-AN graphics
Characters of primary preference appearing 8 times	0-9 . , - *
Characters of secondary preference appearing 4 times	A-Z ¤ $ / +
Characters of least importance appearing twice	% # @ &

The speeds at which graphics in each of the three levels of preformance are printed are included in the table.

Arrangement	Character Set	Nominal Printing Speed - Lines per Minute* 3203 mdl 1	3203 mdl 2 and 4	3203 mdl 3
ALA	162 graphics, 78 preferred	290/155	585/315	-
AN	48 "A" graphics	605	1215	1010
HN	48 "H" graphics	605	1215	1010
OAA (Style A Alphameric)	5 "A" graphics + 43 OCR-A	605	1215	1010
ODA (Style A Numeric)	38 "A" graphics + OCR-A numeric	605	1215	1010
ONA (Style A Numeric)	35 "A" graphics + OCR-A numeric + 3 special characters	605	1215	1010
OAB (Style B Alphameric)	48 (representative of OCR-B graphics)	605	1215	1010
GN (ASCII)	2-level set, 63 graphics	505/290	1020/585	870/530
PCS-AN (Preferred Character Set)	3-level set, 48 "A" graphics	775/505/290	1560/1020/585	1280/870/530
PCS-HN (Preferred Character Set)	3-level set, 48 "H" graphics	775/505/290	1560/1020/585	1280/870/530
PN (PL/I)	60 graphics	505	1020	870
QNC (PL/I - Commercially Preferred)	60 graphics, 45 preferred	595/155	1195/315	998/297
QN (PL/I - Scientifically Preferred)	60 graphics, 45 preferred	595/155	1195/315	998/297
RN (FORTRAN/COBOL Commercial)	52 graphics, 47 preferred	595/155	1195/315	998/297
SN (Text Printing - Commercial)	84 graphics, 78 preferred	405/155	815/315	717/297
TN (Text Printing - Scientific)	120 graphics	290	585	530
YN (High Speed Alphameric)	42 graphics, 39 preferred	675/290	1355/585	-

* When printing diacritical marks over or under alphabetic characters an additional print cycle is required, resulting in reduced throughput.

For train layouts and other information regarding these arrangements, see pages TC 71.1 - 71.8.

Specify: [1] For 1416 -- one print train Feature # for each 1416 ordered. When OCR ribbons are used for either OCR printing or other applications, specify #9488 on the 3203 (also field installable).

[2] If desired, #9140 for enlarged dash (Character No. 732464) in lieu of standard dash for printing on documents to be read by a 3881 Optical Mark Reader. Available as substitution in Arrangements AN2, HN2, AN3 and HN3 only.

[3] If desired, #9549 for slashed zero in lieu of standard zero in any arrangement except OAA, ODA, ONA, OAB, SN5 and TN5.

[4] If desired, #9676 for round alphabetic "O" in lieu of standard squared "O" in any arrangement except OAA, ODA, ONA, OAB, SN5 and TN5.

[5] If desired, #9722 for ¦ (exclamation point) in lieu of | (logical OR) in GN arrangement.

[6] If desired, #9723 for ^ (circumflex) in lieu of ¬ (logical NOT) in GN arrangement.

(continued)

[7] If desired, #9728 for - (timing mark dash) in lieu of # in OAA arrangement for printing timing marks on documents for the 3886 Optical Character Reader. For field installation, order character number 2642392 in train slug 2642393.

[8] If desired, #9729 for - (timing mark dash) in lieu of > in OAB arrangement for printing timing marks on documents for the 3886 Optical Character Reader. For field installation, order character number 2642392 in train slug 1798437.

[9] If desired, #9690 for Non Standard Type Arrangement. See "Type Slug Substitutions" paragraph below.

[10] If desired, #9719 for ' (apostrophe) in lieu of ¤ (lozenge) in AN arrangements to provide compatibility with FC #9490 on the 3776.

[11] If desired, #9650 for ` (grave accent) in lieu of % (percent) and ¢ ¦ \ in lieu of #& @ in the second and fourth arrays (only) in PN arrangements to provide compatibility with FC #9491 on the 3776.

[12] If desired, #9651 for the following substitutions in the SN5 arrangement to provide compatibility with FC #9491 on the 3776:

\ } ' in lieu of @ ' (in the first array
¢% in lieu of) - | in the first array
)# = in lieu of) - | in the second array
?! ; in lieu of @ ' (in the third array
>< ¬ in lieu of) - | in the third array
' \ ~ in lieu of ?! ; in the third array
¦ \ | in lieu of ¢ % ¤ in the third array

Limitations: Alphabetic and numeric characters from arrangements SN5 and TN5 cannot be substituted in any other arrangements, nor can characters from other arrangements be substituted in SN5 and TN5.

Because of greater type face density of the SN5 and TN5 arrangements: (1) Ribbon life may be reduced when printing on continuous forms; (2) The number of normal print quality copies is limited to the original and first copy with the customer using additional copies at his own discretion.

The TN arrangement is limited to use at 6 lines per inch spacing due to the overlap otherwise created by the exponent characters.

The ALA arrangement has the following limitations: (1) Ribbon life may be reduced when printing on continuous forms because of greater type face density. (2) For optimum print quality, single part paper is recommended; (3) 6 lines per inch vertical spacing is recommended when under or over-printing (diacritical marks, etc.); (4) All special applications such as spirit, photo-offset, multilith, diazo, heat transfer or similar process shoulde be tested to assure satisfactory results.

Notes: All standard chains contain some ASCII characters. The GN arrangement provides a 63-character set consistent with the American Standard Code for Information Interchange (ANSI X3.4-1968).

It is important to select the arrangement that gives the highest print speed for the customer's applications. As a guide, the arrangement with the smallest character set should be selected. For example, the AN and HN 48-character sets have a nominal printing speed of 1215 lines per minute on the 3203 mdl 2, while the PN 60-character set runs at 1020 lines per minute (nominal speed).

FC #9690 (Non-standard Type Arrangement) will be specified for: (1) Rearrangement of standard type slugs; (2) Rearrangement of standard characters in one or more slugs; (3) Substitution of other available characters in slugs; (4) New design characters.

Arrangement RN is designed for FORTRAN/COBOL use. Any HN, PSC-HN, PN, QNC, QN and TN arrangement also has this capability.

Type Slug Substitutions: Standard type slugs can be substituted for others in announced arrangements without charge. These slugs are furnished at no charge when properly ordered and plant installed on a chain or in a train. See "Substitute Characters" on page TC 110. For field installation, see "Substitute Characters - Field Installation" on page TC 110 for ordering. Also review "Limitations" above. The frequency of occurrence on the chain/train determines the quantity of identical slugs which must be ordered. See 1403 SRL (GA24-3073) for details of designing a custom train.

SYSTEM/370 and 4300 PROCESSORS -- 3216 INTERCHANGEABLE TRAIN CARTRIDGE OF 3211 PRINTER

Print Trains: The 3216 Interchangeable Train Cartridge consists of 108 carrier assemblies. The assemblies (containing 4 elements each, with one character per element) are placed end to end to form a contiguous train of 432 characters .

Characteristics: The characteristics of the 3216 train construction, combined with the standard Universal Character Set buffer, allow complete flexibility in the selection of the character arrays. Each carrier assembly is made up of 4 physically identical and interchangeable type elements, except for the unique alphabetic, numeric or special character which an element will print. The ability to interchange elements affords the capability to customize the user's train into assemblies which will optimize his work. For details, see 3211/3811 Component Description (GA24-3543). It includes a formula for calculating anticipated throughput with special train cartridges.

Print Train Arrangements: Trains are assigned alphabetic and numeric designations to indicate the type size, style and arrangement. The type style is implied by the leading character and the numeric suffix denotes size and base line reference, with 1 = .094" OCR A font type size, 2 = .095" type size, 3 = .079" type size, and 5 = Text Type Style. Type sizes (the suffix) should not be intermixed. Based on this coding, print trains are assigned a Feature # as indicated below.

System	Printer	Standard Type Style		Alternate Type Style		Text Type Style		OCR A Font Type Style		OCR B Font Type Style	
		.095"	Feature#	.079"	Feature#	Feature#		.094"	Feature#	.094"	Feature #
S/360, S/370	3216 (3211)	A11-2 H11-2 G11-2 P11-2	9411 9414 9417 9420	A11-3 H11-3 G11-3 P11-3	9511 9514 9517 9520	T11-5	9530	AOA-1 AOD-1 AON-1	9608 9611 9612	BOA-5 BON-2	9621 9622

The characters appearing in the following set diagrams are drawings. For more accurate character shapes, see TC 121.4 - TC 121.6.

A11 (48 graphics - Standard Commercial) -- Arrangement consists of 9 identical arrays of 12 assemblies. Only the first array is illustrated.

<.+I	HGFE	DCBA	*$-R	QPON	MLKJ	%,&Z	YXWV	UTS/	@#09	8765	4321

AOA (48 graphics -- Commercial set modified with OCR A-font digits, alphabetics and 7 OCR specials) -- Arrangement consists of 9 identical arrays of 12 assemblies. Only the first array is illustrated. The < + % # @ remain standard .095" type style.

<.+I	HGFE	DCBA	*$-R	QPON	MLKJ	%,&Z	YXWV	UTS/	@#09	8765	4321

AOD (48 graphics - Standard Commercial, with OCR digits) -- Arrangement consists of 9 identical arrays of 12 assemblies. Only the first array is illustrated.

<.+I	HGFE	DCBA	*$-R	QPON	MLKJ	%,&Z	YXWV	UTS/	@#09	8765	4321

AON (48 graphics - Standard Commercial, with OCRA-font digits and 3 specials ⑁⑂⑀ Consists of 9 identical arrays of 12 assemblies. Only the 1st array is illustrated.

⑁.⑂I	HGFE	DCBA	*$-R	QPON	MLKJ	⑀,&Z	YXWV	UTS/	@#09	8765	4321

BOA-5 48 graphics - Modified Commercial, alphameric with OCR B-font graphics except for equals (=) and apostrophe ('). Arrangement consists of 9 identical arrays of 12 assemblies. Only the first array is illustrated.

<.+I	HGFE	DCBA	*$-R	QPON	MLKJ	>,&Z	YXWV	UTS/	'=09	8765	4321

BON-2 48 graphics - Modified Commercial, alphameric but only the 0 thru 9 and + > < are OCR B-font. Arrangement consists of 9 identical arrays of 12 assemblies. Only the first array is illustrated.

<.+I	HGFE	DCBA	*$-R	QPON	MLKJ	>,&Z	YXWV	UTS/	'=09	8765	4321

H11 (48 graphics - Standard Scientific) -- Consists of 9 identical arrays of 12 assemblies. Only the first array is illustrated.

HGFE	).+I	DCBA	*$-R	QPON	MLKJ	(,&Z	YXWV	8765	'=09	UTS/	4321

G11 (63 graphics - ASCII) -- Consists of 4 arrays of 27 assemblies, total of 108 characters per array. Only the first array is illustrated.

'BDJ	L-5K	*C(N	Q?)S	A@=E	¬#R>	V92\	YT[G	68]X	F"H.	|U07	/P3W
MIQ,	41'B	DJL-	5K*C	(NQ$	)SA&	≐E:#	RZV9	2;YT	+G68	<XF%	H._U
07/P	3WMI	Q,41									

P11 (60 graphics - PL/I) -- Consists of 4 arrays of 27 assemblies, total of 108 characters per array. Only the first array is illustrated.

'BDJ	L-5K	*C(N	A@=E	Q?)S	¬#R>	V92"	68<X	YT|G	F%H.	_U07	/P3W
MIQ,	41'B	DJL-	5K*C	(NQ$	=E:#	)SA&	RZV9	+G68	2;YT	<XF%	H._U
07/P	3WMI	Q,41									

T11 (120 graphics - Text Printing) -- Consists of 3 arrays of 36 assemblies, total of 144 characters per array. Only the first array is illustrated.

QXgR	•bJG	3HYf	ITpm	|-uU	hr9c	1,4B	dMSP	_F7.	=NLt	sOn8	EoiC
Aa><	6Ω¢!	+D*)	•‾5 6	7 9–≠	¤°21	± 0 8R	e≥5"	3 3¬4	IT≤@	(–+1	2r9;
{}4[	]%Sj	z?7.	&¬r t	┘└:8	Eq'•	AZx#	60v$	kD*w	+)5(	KW-/	yV21

Note: Trains G11 and T11 have different appearing carrier assemblies. The reason for this is that a number of representative customer jobs were analyzed by computer. The analysis tabulated character usage and developed optimized trains for these character sets.

(continued)

SYSTEM/360, SYSTEM/370 and 4300 PROCESSORS -- 3216 INTERCHANGEABLE TRAIN CARTRIDGE OF 3211 PRINTER

OCR Notes: The IBM OCR characters in Arrangements AOA-1, AOD-1 and AON-1 are derived from, but are not identical to, the designs described in the USASCSOCR standard of the American National Standards Institute. Consequently, it should not be represented that the IBM OCR A Font is the same as the standard OCR A Font. It is recommended that the "OCR Specials" be coded as follows:

Graphic	EBCDIC Card Code	EBCDIC Bit Code
⌐	12-0-9-8-4	1100 1100
¥	12-0-9-8-6	1100 1110
⌐	11-0-9-8-4	1110 1100

The IBM OCR characters in arrangements BON and BOA are derived from, but are not identical to, the designs described in the European Computer Manufacturers Association's Standard ECMA-11 for Alphanumeric Character Set OCB-B for Optical Recognition, 2nd Edition (October, 1971). Consequently, it should not be represented that the IBM OCR-B font is the same as the standard ECMA B-font.

Note: The Print Train Configurator, an IBM Aid Program (AIDS - SE - 010) can provide an optimized train layout and/or a comparison of specified trains. Input is derived from customer streams of printing and output from the configurator provides desired train arrangement, type element usage, carrier assembly definition, as well as projected speeds for the optimized and/or selected train. The aid is to be used by IBM personnel only.

Specify: For plant installation -- [1] One Feature # for print arrangement desired... see Print Train Arrangements above.

[2] If desired, #9549 for slashed zero in lieu of standard zero in any arrangement except AOA-1, AOD-1, AON-1, BOA-5, BON-2 and T11-5.

[3] If desired, #9676 for round alphabetic O in lieu of standard squared O in any arrangement (not applicable to AOA-1, BOA-5 and T11-5).

[4] If desired, #9677 for ⌑ in lieu of < in arrangement AOA-1, AOD-1, A11-2 or A11-3.

[5] If desired, #9140 for enlarged dash for printing on documents to be read by optical mark readers. Available as a substitution in arrangement A11-2, H11-2, P11-2, A11-3 and P11-3 only.

[6] If desired in arrangement G11-2 or G11-3, Exclamation Point (#9722) may be substituted for Logical OR... Circumflex (#9723) may be substituted for Logical NOT.

[7] If desired, #9729 for 3886 timing mark dash (1793636) in lieu of > in BON-2 and BOA-5.

[8] If desired, #9690 for rearrangement of the characters in a standard chain, substitution of other available characters, or new special characters, see "Substitute Characters" below.

New Print Trains: Additional trains are available by ordering 3216 Interchangeable Train Cartridges. Trains are removable and interchangeable. See 3216 in "Machines" for prices, etc... see other options under "Specify" above.

Substitute Characters: It may be desirable to specify an optimized (see above note on train optimization) train to achieve added performance. For available standard arrangements, see previous page. It is not feasible to make actual printing tets on non-standard characters. Therefore printing and ribbon life from trains with non-standard characters may be less satisfactory than results from a standard train. It should also be noted that because of of limitations of type face area (height, width, etc.), characters of the customer's design are not subject to acceptance by the plant.

A subsitute character is one which is ordered to displace a character in one of the standard arrangements. Standard characters may be rearranged, special characters may be selected from the type catalog (TC 121.4 - TC 121.6), or characters of the customer's design may be may be substituted, subject to the above limitations.

Note: Refer to 3211/3811 Component Description (GA24-3954) for card and bit codes recommended for special characters.

Character substitutions may be ordered for plant or field installation on a print train, subject to the following:

Artwork (#9950). A Service Charge will be made for the design of a new character. Characters illustrated in the catalog which follows are not subject to this charge. The plant will review requests for other characters to determine if a charge for Artwork is applicable.

Matrix (#9951). Each print train type element consists of a single alphabetic, numeric or special character. A Service Charge will be made for the matrix unless an identical matrix exists. This charge is in addition to the charge for Artwork.

Set-Up (#9952). In addition to charges for Artwork and Matrix (if applicable), a Service Charge applies each time a set-up is required to fabricate special type elements. This charge is the same regardless of the quantity of identical new elements made at any one time. On reorders of identical type elements, the Set-Up charge again applies.

Service Charges for Artwork, Matrix and Set-Up should be authorized on all orders for non-standard characters. The charges need not be specified when elements from the illustrated catalog (following pages) are ordered. The plant will review all other orders to determine what charges (if any) are applicable.

3216	Feature
Artwork, per character	#9950
Matrix, per type element	9951
Set-Up, per type element	9952

Plant Installation (original assembly of train): ANY STANDARD TYPE ELEMENT (see following pages) may be specified in any of the 432 character positions on the train at no extra charge. See "Specify" below, for action required.

Multiple Machine Orders (identical type specs): Service Charges for Artwork, Matrix and Set-Up are to be entered on the type specification sheet and DP Order Guide for the first 3216 of a multiple machine order. A separate Order Guide must be prepared for the additional 3216s, indicating #9695 for Special Type - Multiple Machine Order (with no Service Charges applicable to Artwork, Matrix and Set-Up). A separate type specification sheet must be prepared for each 3216 (with no Service Charges applicable).

For the additional 3216s, " Specs - Via Terminal Entry" are required for #9695 to state: "Charges on P.O. No._____." (Show Plant Order Number assigned to first 3216.)

When Plant Order Numbers are assigned to the additional 3216s, " Specs - Via Terminal Entry" are required on the first 3216 as follows:

Line 1 -- P.O. No. of first additional 3216.
Line 2 -- P.O. No. of second additional 3216.
Line 3 -- P. O. No. of third additional 3216.
etc.

This indicates that charges for Artwork, Matrix and Set-Up for the first 3216 also cover the additional 3216s.

This cross-reference of Plant Order Numbers is required... otherwise, charges for Artwork, Matrix and Set-Up will be assessed against each 3216.

If an additional 3216 with identical type specs is ordered prior to shipment of the one which carries the Service Charges, specify #9695 on the order, reference the Plant Order No. which carries the Service Charges, and submit a type specification sheet for the new 3216. (Procedure to be followed is described above.)

When an order for an additional 3216 is entered after shipment of the one which carried the Service Charges, the Set-Up charge will apply to fabrication of each different type element.

If a 3216 with #9695 specified at no charge is shipped before the one specifying the Service Charges, the plant will transfer the charges to the 3216 which is shipped first and substitute #9695 on the other one.

(continued)

SYSTEM/360, SYSTEM/370 and 4300 PROCESSORS -- 3216 INTERCHANGEABLE TRAIN CARTRIDGE OF 3211 PRINTER

Specify: [1] Feature # of print arrangement which most closely resembles that desired by the customer.

[2] #9690 (Non-standard Train Arrangement) must be specified for rearrangement of characters in a standard train, substitution of other available characters (following pages), or new special characters.

[3] Use appropriate 3216 type specification sheet and follow directions contained on the form:

Train Arrangement	Train Arrangement
A11-2	A11-3
H11-2	H11-3
G11-2	G11-3
P11-2	P11-3
	T11-5

Note: In the example of a character substitution on these forms, the question mark (?) is shown as part number 2471454. This part number has been changed to 2645350 and will be corrected when the forms are reprinted.

For character substitutions in AOA-1, AOD-1 or AON-1 train, use the A11-2 Type Specification Sheet and change headings as appropriate.

A type specification sheet must be prepared for each non-standard train arrangement, except for the character substitutions under "Specify" on the previous page. Do not intermix type sizes or styles.

[4] Enter quantity of Feature #s for Artwork, Matrix and Set-Up based on number of different special characters being ordered.

[5] Enter order for 3216 , including Specify 1, 2 and 4, above. When Plant Order No. has been assigned, post to type specification sheet and forward to Plant. Once the type spec sheet has been forwarded to the plant, if further changes are desired, a new spec sheet must be completed including all characters desired... those previously ordered and the new ones. If increased Service Charges apply, the total new charges should be entered on the spec sheet. input is required to update the charges listed for the on-order 3216.

Substitute Characters: (cont'd)

Field Installation: The prices apply to field installation of standard type elements (or special elements to which charges for Artwork, Matrix and Set-Up are to be added as applicable).

Print trains are made up of number of identical arrays of carrier assemblies. When a modification is made to a carrier assembly in one array, corresponding carrier assemblies should be changed in all identical arrays. Field modifications converting to OCR characters for use in OCR applications should not be made.

Type Element Substitution in a Print Train	Feature
First type element, anywhere in train	*8481
Each additional element (same 3216, at same time), anywhere in train	8482

Specify: [1] Feature * of installed train arrangement which is to be modified.

[2] Applicable Feature #s and charges (based on number of different special characters) for Artwork, Matrix and Set-Up.

[3] Submit MES with appropriate type specification sheet attached. (Type spec sheet form numbers are listed at bottom of previous page.)

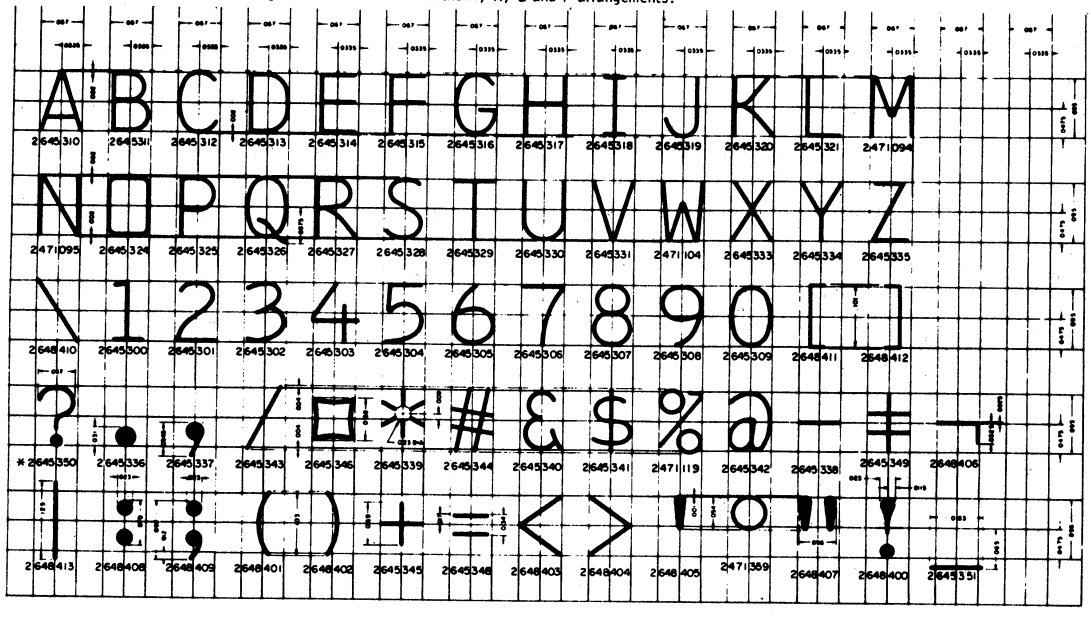
SYSTEM/360, SYSTEM/370 and 4300 PROCESSORS -- 3216 INTERCHANGEABLE TRAIN CARTRIDGE OF 3211 PRINTER

The characters illustrated below do not necessarily represent the final appearance of the printed characters in every detail. This is because they are made from drawings (original artwork) of the characters and not from actual print samples. Dimensions shown are approximate and are not the final dimensions of the printed characters. Final dimensions will be somewhat larger and they will vary depending upon the characteristics of the ribbon and paper used.

The reproductions are approximately five times actual type size. The 7-digit number which appears directly below each character is the part number assigned to the type element containing that character.

.095" Type Size -- Various combinations of the following characters are used in the A, H, G and P arrangements.

Line 1



Line 2

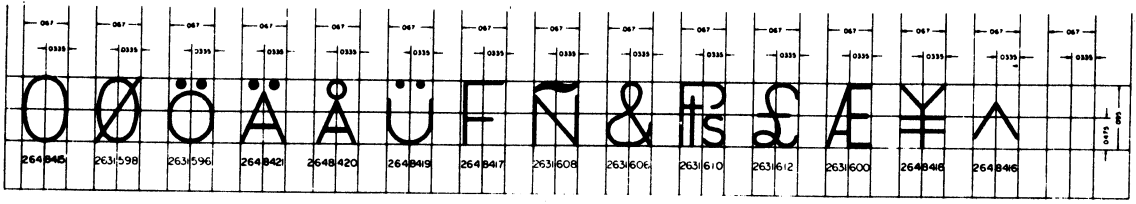
Line 3

Line 4

Line 5

.095" Type Size -- Special Characters

Line 6



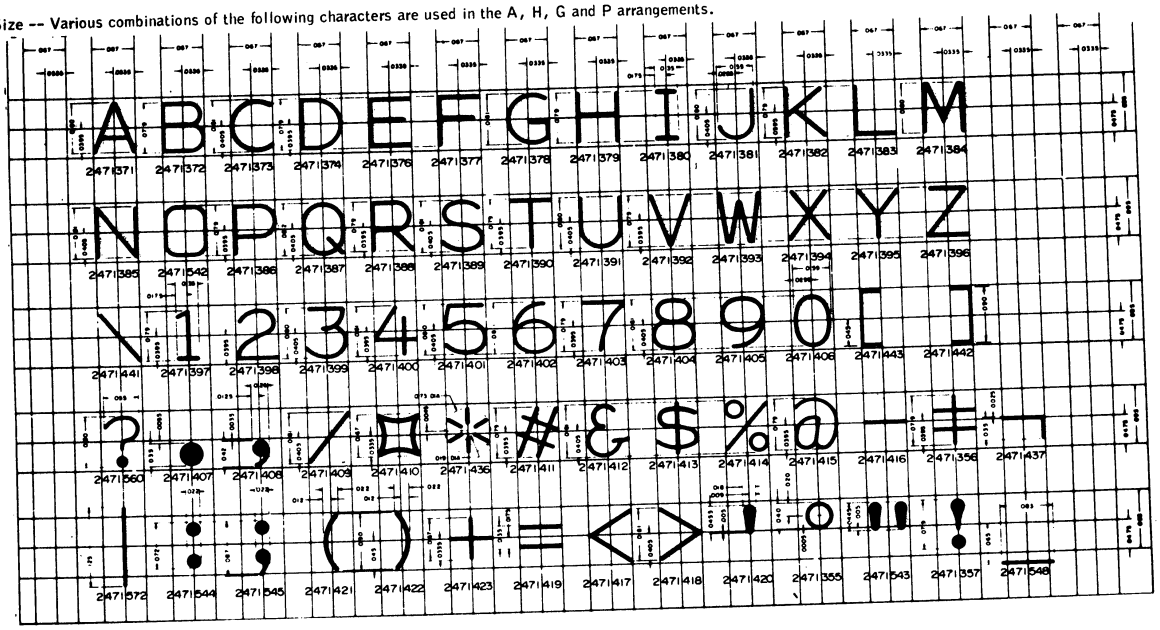
In the above illustrations, new part numbers have been assigned to the type elements for each character. Line 1 includes letters A through M, Line 2 includes N through Z, etc. Based on this sequence, the new part numbers are listed below referenced to the former part numbers.

Line 1		Line 2		Line 3		Line 4		Line 5		Line 6	
New Part No.	Former Part No.	New Part No.	Former Part No.	New Part No.	Former Part No.	New Part No.	Former Part No.	New Part No.	Former Part No.	New Part No.	Former Part No.
2645310	2471082	2471095 †	2471095	2648410	2471457	2645350	2471454	2648413	2471572	2648415	2631587
2645311	2471083	2645324	2471096	2645300	2471072	2645336	2471108	2648408	2471452	2631598 †	2631598
2645312	2471084	2645325	2471097	2645301	2471073	2645337	2471109	2648409	2471453	2631596 †	2631596
2645313	2471085	2645326	2471098	2645302	2471074	2645343	2471115	2648401	2471364	2648421	2631594
2645314	2471086	2645327	2471099	2645303	2471075	2645346	2471118	2648402	2471365	2648420	2631602
2645315	2471087	2645328	2471100	2645304	2471076	2645339	2471111	2645345	2471117	2648419	2631616
2645316	2471088	2645329	2471101	2645305	2471077	2645344	2471116	2645348	2471367	2648417	2631605
2645317	2471089	2645330	2471102	2645306	2471078	2645340	2471112	2648403	2471368	2631608 †	2631608
2645318	2471090	2645331	2471103	2645307	2471079	2645341	2471113	2648404	2471369	2631606 †	2631606
2645319	2471091	2471104 †	2471104	2645308	2471080	2471119 †	2471119	2648405	2471370	2631610 †	2631610
2645320	2471092	2645333	2471105	2645309	2471081	2645342	2471114	2471359 †	2471359	2631612 †	2631612
2645321	2471093	2645334	2471106	2648411	2471561	2645338	2471110	2648407	2471451	2631600 †	2631600
2471094 †	2471094	2645335	2471107	2648412	2471562	2645349	2471358	2648400	2471360	2648418	2631614
						2648406	2471437	2645351	2471548	2648416	2631592

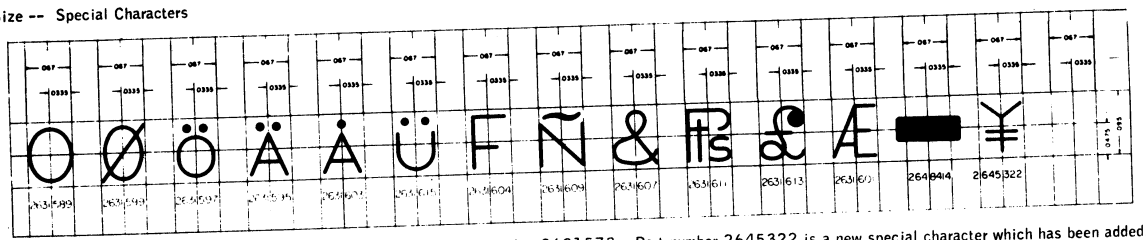
† No change in part number.

SYSTEM/360, SYSTEM/370 and 4300 PROCESSORS -- 3216 INTERCHANGEABLE TRAIN CARTRIDGE OF 3211 PRINTER

.079" Type Size -- Various combinations of the following characters are used in the A, H, G and P arrangements.

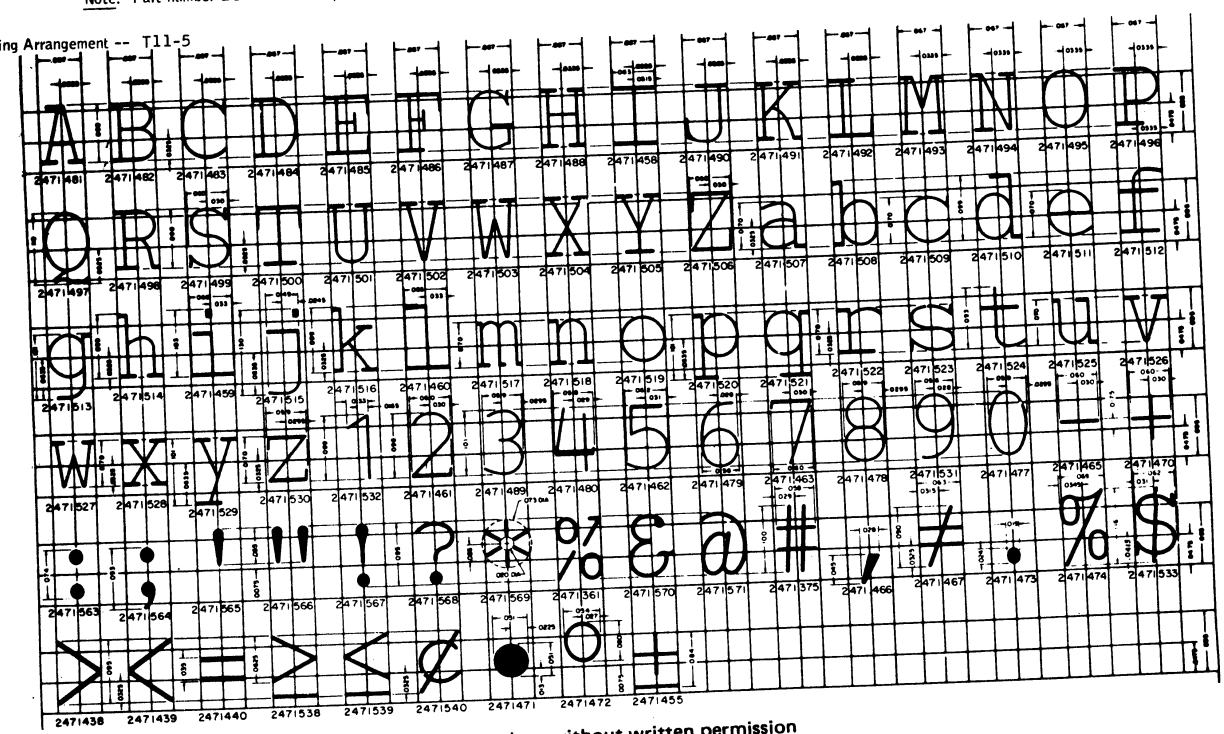


.079" Type Size -- Special Characters



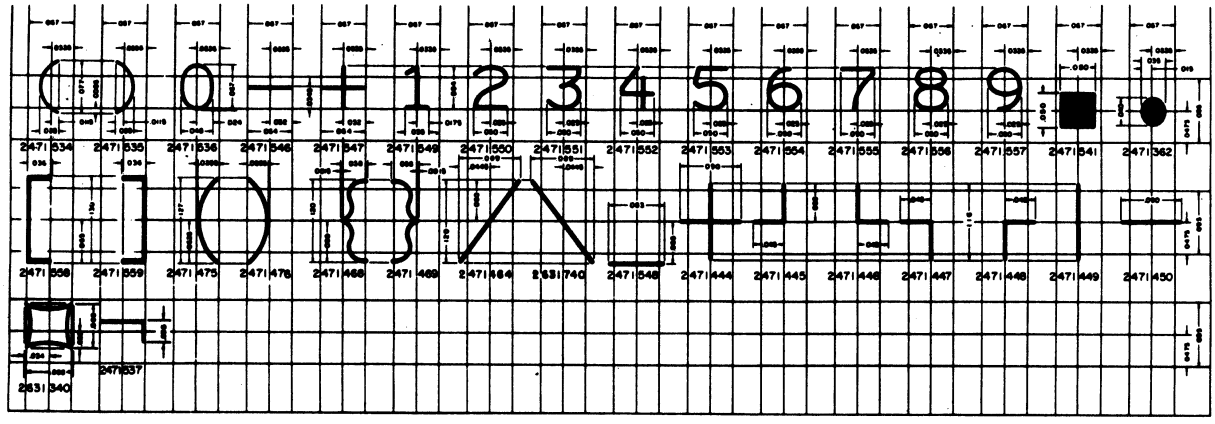
Note: Part number 2648414 was previously listed as part number 2631573. Part number 2645322 is a new special character which has been added.

Text Printing Arrangement -- T11-5



SYSTEM/360, SYSTEM/370 and 4300 PROCESSORS -- 3216 INTERCHANGEABLE TRAIN CARTRIDGE OF 3211 PRINTER

Text Printing Arrangement -- T11-5 (cont'd)



Note: Illustration for 2471464 previously shown as 2631740 in error. Illustration for 2631740 previously shown as 2471363 in error.

.094" OCR-A Font, Size 1 -- AOD and AON arrangements include 0-9 illustrated below. AON also includes the hook, fork and chair graphics. In addition, both arrangements include standard .095" alphabetic and special characters as illustrated in the train layouts on page TC 121.1.